MICROSOFT®

The High Performance Software™

Microsoft® Chart

Complete Business Graphics Program

for IBM® Personal Computer

Microsoft Corporation

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Introduction

Microsoft® Chart is a powerful tool for producing high quality business graphics. With Chart, you can convert large quantities of complex data into exciting, concise charts.

Presenting your findings to others persuasively is never easy. But thanks to Chart's extensive editing and formatting capabilities you will be able to produce customized charts that let you effectively communicate with your audience. You will capture their attention with a well-designed chart, allowing them to more easily analyze, understand, and remember your key points.

Chart is a powerful tool, yet it's easy to use. You don't have to use the many individual formatting features each time you design a chart, because Chart has an on-screen "gallery" of 45 standard chart types. All you do is select the type of chart you want, and Chart does all the formatting for you.

Change your mind? Go back to the Gallery, choose another type, and Chart quickly reformats your data. You can go from a pie chart to a line chart to a column chart to two side-by-side charts in just a few keystrokes. Different types of charts communicate and emphasize various aspects of your data. Chart makes it quick and very easy to choose the most effective way to present your data.

As with Microsoft Multiplan® and Microsoft Word, the full names of the command options are always presented clearly at the bottom of the screen. You choose a command either by pressing the key for the first letter of the command or by highlighting the command and pressing the RETURN key. And if you are ever in doubt about how to use a particular command or feature, on-line help is never more than a keystroke away.

Chart a Wide Variety of Data

You need data to build charts. You can enter data directly from the keyboard, or load files from other popular software programs. Chart lets you load files produced by Multiplan, as well as those produced by products such as Lotus® 1-2-3®, Visicalc®, dBASE II®, or any program that supports the DIF, dBASE II, ASCII, or SYLK file format. Chart will take the data from these programs and turn it into charts suitable for presentations.

The kinds of data you can use in charts are practically limitless. Sales, budgets, costs, interest rates, stocks, flow, projections vs. actual, rates of increase or decrease, past vs. present, present vs. future, production, participation, staffing, and levels of performance are just some of the kinds of data you can work with.

What can you do with your data? Use charts to show an overall picture, clarify complex relationships, give a quick history, reveal trends, call attention to unusual information, help you decide when to act, and help you confirm decisions. Chart can help you make many kinds of decisions and communicate a wide variety of important points.

Chart lets you enter as much data as your computer's memory allows. When you want to analyze your data, Chart can perform eight different statistical analyses, including trend line and curve-fitting.

It's Easy to Build a Chart

With Chart's unique Gallery feature, you can build a chart in three short steps.

1. Name a data series, specifying a title and axis labels. All you do is fill in one simple menu.

2. Enter your data, either from the keyboard or by loading data files created by other software programs.

3. Use the Gallery to select from 45 standard chart formats. Press a key to indicate your choice. Chart does all the formatting for you and draws your chart.

The standard formats are broken into eight types. Each has a particular use depending on the type of data and what you want to emphasize:

- Line charts are used with time series data when you have many items of data to plot and you want to highlight trends in the data.

- Column charts are better for time series with a small number of points or when there is extreme variability in the data.

- Bar charts are best for showing comparisons when your data is text (for example, company names).

- Area charts effectively communicate the magnitude of the values in a time series as well as their trend over time.

- Pie charts show relative proportions of different items at a given point in time.

- Scatter charts are most frequently used with statistical data when you want to see if a relationship exists between two variables.

- Mixed charts have one chart overlayed upon another or two charts positioned side-by-side. You can use them to compare different kinds of data in one chart.

- Hi-lo charts show data highs and lows for a certain time period, and the trend over time. Charts of stock prices are commonly hi-lo charts.

Chart lets you design text-only charts. You can use the wide selection of fonts, font sizes, patterns, and borders to produce high-quality text displays.

Make it Look Just Right

Chart gives you flexibility to edit your chart to suit your needs. Separate segments from a pie chart. Change the pattern of lines, line segments, or columns. Add borders or frames around the chart, text, or legends. Move any part of the chart, or change its size, so it looks just right. Change colors. Add grids. Insert extra text wherever you want it. Emphasize any part of the chart with an arrow, or double the thickness of a line. Change the axis scale, or reverse it.

You can even split the screen into sections and put up to 16 charts on one page. Or overlay one chart on top of another to achieve the effect you want.

As you get to know Chart and experiment with it, you'll discover exciting new ways to communicate with business graphics.

Design and Save Your Best Charts

When you design attractive formats, you can save them and use them over and over again with different data. You just enter new data, and apply a favorite format to it. It's as quick and efficient as using the Gallery. Presentation-quality graphics do not have to take a lot of time and effort.

Produce High-Quality Printed Charts

When you're finished creating the chart you want, you can choose from a large variety of printers and plotters to produce your printed chart. You can generate full-color paper output or transparencies, and the end result is a polished, professional presentation.

Learning About Chart

Feel free to experiment with Chart. The best approach is to sit down with Part 1 of your manual, "Learning Chart," and discover how easy it is to produce high-quality charts. Then, after you've become familiar with the commands that you will use most often, you can refer to other sections of the manual to learn the more advanced features that will help you produce better and better charts.

About This Manual

This manual tells you how to use Chart to create charts quickly and accurately. Once your computer is set up and working, read "Getting Started," and follow the procedures described there. It tells you how to prepare disks for working with Chart.

When you have a question about which key to use, see "The Keyboard."

The "Operating Information" section provides technical details that you'll find useful after you've become familiar with the basics of using Chart. It also tells you how to use Chart with a hard disk and gives details on using printers and plotters with Chart.

Part 1, "Learning Chart" is designed to introduce you to Chart. Step-by-step, it will teach you the basic skills of Chart.

When you need information on how to do a specific charting task, look in Part 2, "Using Chart." Part 2 is not designed to be read straight through, although it can be. Each section is a self-contained explanation of how to complete a particular task. You should become familiar with the table of contents for Part 2. It will help you find quickly what you need.

To refresh your memory or find additional information on a particular command or screen message, refer to Part 3, "Reference to Chart."

The appendices at the back of the manual detail related topics such as converting data files from other programs into a form that Chart can read, and a glossary defines terms you may not understand.

Notes on the Chart 2.0 Release

This release of Microsoft Chart (version 2.0) contains several additions and enhancements to version 1.0. Foremost among these are the following:

- Chart's new Setup program makes it easier for you to specify the output device you use with Chart, and to copy DOS to your program disk or to copy the Chart program and all available fonts to a hard disk. For instructions on running the Setup program, see the "Getting Started" section of this manual.

- Chart now supports a greater number of printers and plotters. Chart also supports various film devices, such as the Polaroid Palette, that allow you to easily produce color slides of the charts you make. Depending upon the graphics card and print device you use with Chart, you can select from a spectrum of 177 colors to produce distinctive presentation-quality color graphics. Color selection has been expanded for such devices as the Polaroid Palette and VideoShow 150. For details, see the Format Color command in Part 3 of this manual.

- Chart now supports the IBM® Enhanced Graphics Adapter Card for enhanced graphics capability.

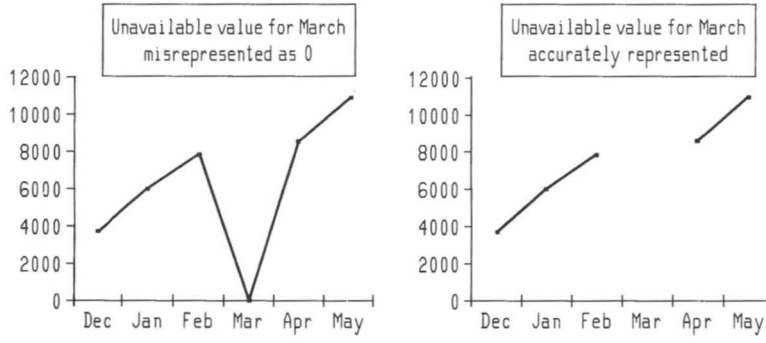
- Chart now supports high density printing on selected printers. To see a list of such printers, choose Devices from Chart's Help menu. The names of high density printer drivers begin with HI. For example, the list identifies the high density printer driver for the Texas Instruments 855 as HITI855.GPD.

- Chart's enhanced Xternal command replaces the CONVERTD utility, thereby simplifying the procedure for copying data to Chart from Multiplan, Lotus 1-2-3, Lotus Symphony®, dBASE II and dBASE III. You can also copy any file stored in SYLK or DIF format, as well as columnar and delimited text files (for example, text files that you've previously downloaded from a mainframe computer, or spreadsheets that you've printed to a file). You can also link Chart files to their external source files.

For details, see "Copying Data from Other Application Programs" in Part 2 of this manual, and the Xternal command in Part 3.

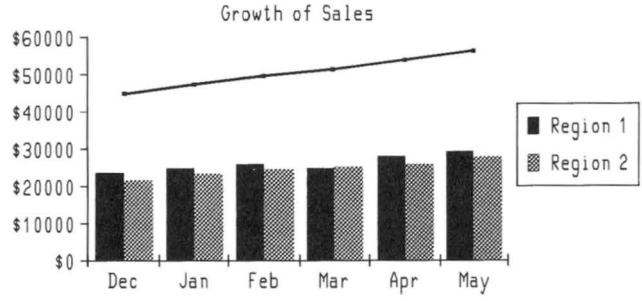
- A new option has been added to the Analyze menu of subcommands. Analyze Math allows you to create a new data series by performing various arithmetic operations on two existing series. For details, see the Analyze command in Part 3 of this manual.

- You can now indicate unavailable values within a data series. To do this, you enter an asterisk (*) in the Value column of the Entry screen. The pattern for an unavailable value on the Chart screen is automatically set to clear, making it invisible. This lets you accurately represent an unavailable value rather than misrepresent it as zero.



- Note that the presence of an unavailable value affects any new series you create with the Analyze subcommands. Whether or not Chart calculates a new value from an unavailable value depends upon the purpose of the particular subcommand that you use. Chart treats all new values that it doesn't calculate as unavailable values. When drawing a chart of a calculated series, Chart does indicate categories for all data points even if their values are unavailable.

- You can now control which series appear in the legend and the order in which they're listed. This feature allows you, for example, to omit a series from the legend when its meaning is clear from either the context or title of the chart. In the chart shown below, the name of the series represented by the growth line has been removed from the legend because its meaning is clear from the chart's title.



For instructions on controlling the content and ordering the series within the legend, see the discussion of the "series" field under the Format Type (legend selected) command in Part 3 of this manual.

Other Changes to Chart

In addition to the major enhancements described above, version 2.0 differs from version 1.0 as follows:

- Chart no longer runs in 40-column mode on 128K computers, or under any version of DOS prior to 2.0. For system requirements, see "What You Need" in "Getting Started."

- You can now enter as many as 128 data points per data series. This doubles the former maximum number of 64.

- A Print Setup command has been added to the Print command menu. You use this command to tell Chart the name of the print device you're using and whether the device is connected to a parallel or serial adapter. For details, see the Print Setup command in Part 3 of this manual.

- The Print Options command has been modified. The set of command fields displayed by Print Options is keyed to your response in the "device" field of the Print Setup command. Print Options will now display command fields appropriate for the device (printer, plotter, or film device) you use to print your charts. For details, see the discussion of the Print command in Part 3 of this manual.

- You can now print charts in batch mode. For details, see "Operating Information." You can also print multiple copies of your charts; see the Print Options command in Part 3 of this manual.

- You can now cancel the drawing of a chart by pressing the CANCEL key.

- Zero (0) no longer appears as the default in the Value column of the Entry screen.

- The following messages have been added:

"Formatting..."	appears whenever you draw a new chart.
"Loading..."	appears whenever you use the Xternal command to copy (load) data from another application program.
"Command does not apply to selected device"	appears if you attempt to carry out a command that is not suited to a particular graphics device. For example, you cannot use the Print File command if you are printing charts with the Polaroid Palette.

Getting Started

Read this section before you begin using Chart. The following topics are discussed:

What You Need
Setting Up Chart
Copies of Chart
Starting Chart
Running Chart with Microsoft Windows or IBM Topview™

What You Need

To use Chart, you need:

- An IBM Personal Computer or compatible machine, with at least 256K of memory
- At least one double-sided disk drive
- An IBM color graphics adapter, an IBM Hercules™ graphics card, an IBM enhanced graphics adapter card, or any graphics card compatible with the above
- An 80-column color graphics monitor, IBM enhanced color graphics monitor, 80-column black and white monitor, or IBM monochrome monitor (only with a Hercules™ Graphics Card or IBM enhanced graphics adapter card), or any monitor compatible with the above
- A DOS (Disk Operating System) disk, version 2.0 or higher
- A copy of the Chart Program disk
- A copy of the Chart Utilities disk
- Several formatted blank disks
- A graphics printer, plotter, or other output device (optional)

Setting Up Chart

Before you run Chart for the first time, you need to run the Setup program included on your Chart Utilities disk. You use the Setup program to:

- Tell Chart which graphics printer, plotter, or other output device you are using
- Copy DOS onto the Chart Program disk
- Format a disk to store charts on
- Copy the Chart program, fonts, and the CHART.PIF file to a hard disk, if you have one

Once you've run the Setup program, you'll be able to perform the following tasks:

- Start Chart. By putting DOS on your Chart Program disk or by putting Chart on your hard disk, you can start your computer and Chart from the same disk
- Print charts. By recording the name of your graphics printer, plotter, or other output device (for example, the Polaroid Palette), you'll be ready to print presentation-quality charts whenever you start Chart
- Store charts. By formatting a disk to store your charts on, you'll be ready to store charts as soon as you create them

To run the Setup program:

1. Turn off your computer, open the door to drive A, and insert the Disk Operating System (DOS) disk.
2. Close the door to drive A and turn on your computer.
3. When DOS prompts you to do so, enter the current date and time.

4. When the DOS prompt appears, open the door to drive A and remove the DOS disk.

5. Insert the Chart Utilities disk and close the disk drive door.

6. Type *setup*

   If you are using a hard disk system, type *a:setup*

7. Press ENTER.

Once the Setup program is running, follow the instructions on the screen. When you've finished the Setup program, you are ready to start Chart as described in "Starting Chart" below.

Note

If you change output devices, you do not need to rerun the Setup program. Instead, you can inform Chart of the change by changing the current response in the "device" field of the Print Setup command.

Copies of Chart

Microsoft Chart is not copy-protected. Use the DOS DISKCOPY command to make backup disks. Run the Setup program to copy Chart onto a hard disk.

Starting Chart

If you are running Chart for the first time, and haven't yet run the Setup program, do so now.

If you plan to store the charts you make on floppy disks, you need to format the disks. See your DOS manual for information on how to format disks.

If you are starting Chart for the first time, work through the exercises in Chapters 1 through 3. The procedure for starting Chart varies slightly depending on whether you are going to work through the exercises or proceed on your own.

To start Chart on the IBM PC:

1. Put your copy of the Chart Program disk in drive A and turn the computer on. If it is already on, press the Del key while holding down the Ctrl and Alt keys.

2. Respond to the DOS date and time prompts.

3. If you are starting Chart for the first time and plan to work through the exercises in Part 1, type *chart census* when you see the DOS prompt. This tells Chart to automatically load and display the file called CENSUS, which is used in the exercises.

4. If you are already familiar with Chart, type *chart* to start the program without loading a file, or type *chart* (followed by the name of the file you want to load) to start the program and load the specified file.

5. Press the ENTER key.

Running Chart with Microsoft Windows or IBM Topview

Chart will run with Microsoft Windows or IBM Topview installed. This is made possible by the CHART.PIF file that comes on your Program disk. If you are using a hard disk system, the Setup program will copy the CHART.PIF file to the same directory that it copies the Chart program to.

Chart runs with Microsoft Windows as a standard application, as described in Chapter 9 of the *Windows User's Guide*. For example, you can quickly move back and forth between Chart and other applications (such as Microsoft Multiplan) that you are running with Windows at the same time. You can also move a chart on your screen to another window, and then apply an appropriate Windows application to the chart. For example, you can use Windows Paint to draw your company's logo on the charts you make.

The Keyboard

The following table illustrates key names and key actions used in Microsoft Chart. In this manual, "name" describes what the key does rather than what appears on the key itself. For example, the ESCAPE key on the IBM Personal Computer keyboard has the name CANCEL because it cancels the current command and lets you choose another.

Note that some keys perform more than one action depending on when you use them in the program. For example, on the List screen, you use the direction keys to select a data series for editing or for inclusion in a chart. On the Chart screen, you use the direction keys to select objects for formatting.

A hyphen (-) between keys means to press the second key while holding down the first.

In the first column of the following table, the symbols listed below identify the menu, field, or screen to which the specified actions apply:

CM	=	Command menu	L	=	List screen
FCF	=	Fill-in command field	E	=	Entry screen
MCF	=	Menu command field	C	=	Chart screen

Choose and Carry Out Commands

In	Action	Key	Name
CM FCF MCF	Carry out command	↵	RETURN
	Cancel command	Esc	CANCEL
CM	Highlight next command	F10	SPACEBAR or CHARACTER RIGHT
	Highlight previous command	← F9	BACKSPACE or CHARACTER LEFT
FCF MCF	Move to next command field	⇤ ⇥	TAB
	Move to previous command field	⇧-⇤ ⇥	BACKTAB
MCF	Highlight next option	F10	SPACEBAR or CHARACTER RIGHT
	Highlight previous option	← or F9	BACKSPACE or CHARACTER LEFT
C	Redraw chart	F4	REDRAW

Edit Responses in Fill-in Command Fields

In	Action	Key	Name
FCF	Highlight word left	F7	WORD LEFT
	Highlight word right	F8	WORD RIGHT
	Highlight character left	F9	CHARACTER LEFT
	Highlight character right	F10	CHARACTER RIGHT
	Delete highlighted characters	Del	DELETE
	Delete character left of highlight	←	BACKSPACE
	Insert line break in text	⇧-↵	NEWLINE
	Enter special characters from IBM character set	Alt-###	

Move or Size Objects on Chart Screen

In	Action	Key	Name
C	Enlarge object; move it up	↑ or PgUp	UP or PAGE UP
	Shrink object; move it down	↓ or PgDn	DOWN or PAGE DOWN
	Enlarge object; move it right	→ or Ctrl-→	RIGHT or PAGE RIGHT
	Shrink object; move it left	← or Ctrl-←	LEFT or PAGE LEFT

Selection Keys

In	Action	Key	Name
C	Select next chart	F1	NEXT CHART
	Select previous chart	⇧-F1	PREVIOUS CHART
	Select next object	↓	DOWN
	Select previous object	↑	UP
	Select next object of same type	→	RIGHT
	Select previous object of same type	←	LEFT
E	Display next series	F2	NEXT SERIES
	Display previous series	⇧-F2	PREVIOUS SERIES
	Select next category or value	↓ or →	DOWN or RIGHT
	Select previous category or value	↑ or ←	UP or LEFT
	Select first entry on screen	Home	HOME
	Select first entry in series	Ctrl-PgUp	CTRL-PAGE UP
	Select last entry in series	End or Ctrl-PgDn	END or CTRL-PAGE DOWN
	Scroll display up one screen	PgUp	PAGE UP
	Scroll display down one screen	PgDn	PAGE DOWN

Selection Keys (Continued)

In	Action	Key	Name
L	Select next series	↓	DOWN
	Select previous series	↑	UP
	Select first series on screen	Home	HOME
	Select first series in list	Ctrl-PgUp	CTRL-PAGE UP
	Select last series in list	End or Ctrl-PgDn	END or CTRL-PAGE DOWN
	Scroll display up one screen	PgUp	PAGE UP
	Scroll display down one screen	PgDn	PAGE DOWN
CM MCF	Display information about highlighted option	Alt-h or ?	HELP
FCF	Display information about highlighted command field	Alt-h	HELP

Locking Keys

In	Action	Key	Name
L E C	Make alphabetic characters upper case	Caps Lock	CAPS LOCK
	Activate numeric keypad	Num Lock	NUMBER LOCK
L E	Make UP and DOWN keys scroll display	Scroll Lock	SCROLL LOCK

Operating Information

You will find the information in this section useful once you are familiar with Chart. The following topics are discussed:

Files and Filenames
Disks and Drives
Disk Space
Different Ways to Start Chart
Printing Charts in Batch Mode
Printers and Plotters

Files and Filenames

The Chart programs and the charts you will produce are files stored on either hard or floppy disks. This section describes the types of files that come with Chart, and discusses how you name the files you create.

Chart comes on two disks, the Chart Program disk and the Chart Utilities disk. The following files are on the Chart Program disk:

CHART.COM	Chart startup program
MC.PGM	Chart program file
MC.HLP	Chart help file
FONTLIST	List of font files
CENSUS	Sample file used in Part 1, "Learning Chart"
CHART.PIF	File for running Chart with Microsoft Windows or IBM Topview

The following files are on the Chart Utilities disk:

SETUP.COM	Chart setup file
EXAMPLE*.*	Example charts
*.GDP	Printer/plotter/other driver files
*.SFT	Stroke font files
*.RFT	Raster font files

Note

The asterisk indicates any combination of letters or numbers. For example, *.SFT indicates any filename followed by the .SFT extension.

Whenever you use the Quit command, Chart creates the MC.INI file and stores it on the disk or in the directory that contains the Chart program. This file contains information about the options you've chosen in the Options, Print Options, Print Setup, and Transfer Options commands. If you delete the MC.INI file, Chart will not remember the options you chose, and will therefore reset all changed options to those that were in effect the first time you used the program.

The following guidelines apply to naming files:

- Filenames may be up to eight characters long.
- Filenames may use any combination of uppercase and lowercase letters.

- Filenames may have an extension, consisting of a period (.) followed by up to three additional characters.

- Filenames should begin with a letter, followed by any combination of letters (A-Z), numbers (0-9), or the following characters:

  $ & % ' ( ) - _ ^ { } ` ! @

Any time Chart asks you to enter a filename, you may enter the filename alone (if the file resides in the default drive or directory), or the filename preceded by the name of the drive or the pathname to the directory that contains the file. For example, if you use the Transfer Load command to load a file named ENERGY.SLK, you could enter *energy.slk*, *b:energy.slk*, or *b:\data\energy.slk*, depending on the location of the file.

Disks and Drives

Unless you are using a hard disk to store all of the Chart programs, the font files, and your charts, you need to keep track of which files are on which disks, and which disks go in which drives.

In addition to your Chart Program disk, which contains all the files necessary to use Chart, and the Chart Utilities disk, which contains the font and device driver files, you will have one or more data disks for storing the files containing the charts you create.

Whether or not you are using a hard disk, you will always have a data drive. A data drive is any drive on which Chart saves files with the Transfer Save and Print commands, or from which Chart loads files with the Transfer Load, Transfer Merge, and Xternal commands. Any drive, including Microsoft RAMDrive™ or another electronic disk, can be a data drive. On a hard disk system, Chart considers the directory containing the file you want to work with as the data drive.

If you do not specify a drive when Chart asks you to enter a filename, Chart will look for or save the file on the default data drive. The initial default data drive is always the same as the drive from which you started Chart. You can use the Transfer Options command to change the default data drive. See "Changing the Default Data Drive" in Chapter 8 for details.

In general, if you are working with two floppy disk drives, you should have your Chart Program disk in drive A and a data disk in drive B. The initial default data drive will be drive A. Use the Transfer Options command if you want to change the default data drive to drive B.

Any time Chart displays the message:

```
Enter Y to retry access to (filename) ...
```

it means that Chart cannot find the named file on the disk on which it is looking. In this case, you should replace the disk with the disk containing the named file, and press *Y* for Yes. If you are using a hard disk system, you should use the Transfer Options command to specify the correct pathname to the file you want.

Disk Space

Before starting a charting session, make sure that the data disk you will be using has space for saving new or edited files. If you try to save a file that is larger than the available space on the data disk, you will see the message:

```
Disk full
```

In this event, you should first try to create space by deleting unnecessary files with the Transfer Delete command. Then try to save the file again. If you are using a floppy disk system and still do not have enough space after deleting unnecessary files, either replace the full disk with another disk and save the file, or save the file onto a disk in another drive. To avoid running out of disk space, leave plenty of space on your current data disk. Always keep several spare formatted disks handy to use as data disks.

Different Ways to Start Chart

There are three ways to start Chart on the IBM PC:

Type:	To:
chart	Start Chart.
chart filename	Start Chart; automatically load the specified file and display the chart on the Chart screen.
chart /p	Start Chart in batch printing mode.

If you type *chart*, then type the filename, Chart looks for the specified file on the default drive or directory. If the file is found, Chart automatically loads it and displays the chart on the Chart screen. If the file is on a drive or in a directory other than the default, you must precede the filename with the name of the drive or directory. If the file is not found, Chart displays the message:

```
Enter Y to retry access to (filename)
```

In this case you should press *N*, and Chart will display the List screen with an empty List. To find out what to do next, see the above message in Chapter 10, "Message Directory."

Printing Charts in Batch Mode

You can print more than one Chart file by starting Chart in "batch" mode. Doing so enables you to print multiple copies of a single Chart file and/or single copies of different Chart files during a printing session.

To print files in batch mode, you first create an unformatted text file named PRNTLIST with any word processor or text editor. In this file, you list the names, and the number of copies, of all Chart files you want to print. A typical PRNTLIST file would look like this:

```
chart1.mc
sales.mc
forecast.mc
analysis.mc 5
```

The above file specifies printing of one copy each of the first three Chart files, and five copies of the last Chart file.

Once you've created the PRNTLIST file, copy the file to your Chart Program disk or to the directory containing your Chart program. Then, to print the listed files in batch mode, simply start Chart by typing */p prntlist*.

Part 1
Learning Chart

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Chapter 1
Learning About Chart

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In this chapter, you'll learn about Chart by working with some sample data from your Program disk. The data describes the population growth of Springfield, a model city, and its suburbs, both of which lie within the borders of James County. The data on Springfield and on suburban James County each form a data series. Both data series are contained in a file named CENSUS.

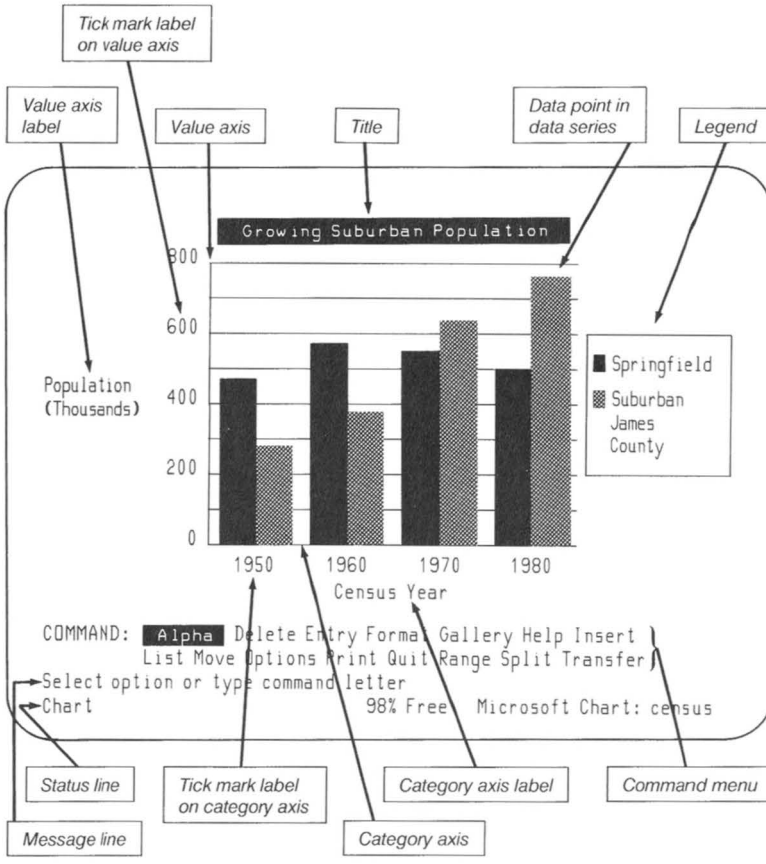
As you work through the exercises in this chapter, you will see how data from the CENSUS file appears on each of the three screens used in Chart: the List screen, the Entry screen, and the Chart screen.

If you have not yet read and followed the steps in "Getting Started" at the front of this manual, do so now. After you've responded to the system's time and date prompts:

1. Type *chart census* following the DOS prompt.

2. Press the RETURN key.

The Chart Screen



This is the Chart screen, where you display and make changes to your charts. On your screen now is a column chart, the type that Chart draws for you unless you choose a different type. In the next chapter, you'll learn about the different types of charts you can make.

Each of Chart's three screens has a command menu, a message line, and a status line. The command menu, near the bottom of the screen, contains commands for you to choose from. You choose the actions you want Chart to perform from these commands.

Directly below the command menu is the message line. It tells you what to do next and alerts you to any errors. For example, the message line now tells you to "Select option or type command letter," indicating that Chart is ready for you to choose a command from the command menu.

The status line, at the bottom of the screen, helps you keep track of the progress of your work. For example, it tells you the amount of free space left for your work and the name of the file you're working with. The CENSUS file is now indicated on the far right of the status line.

For more information on command menus, the message line, and the status line, see Chapter 4, "Using Commands."

A chart is a graphic comparison of numeric data. For example, the chart on your screen compares the population growth of Springfield with that of suburban James County over the last three decades. The solid columns show the population of Springfield in each census year, and the patterned columns show that of suburban James County.

As you make and revise charts, you will work with five basic chart parts:

1. A data point or data series
2. An axis
3. A legend
4. A label
5. The entire chart with all its parts

We refer to these five parts as the "objects" of the chart.

Frequently, you will change the appearance, or "format," of a chart—for example, the pattern or color of a column, the position of an axis, or the size of a legend. To make a change, you first select the object you want to change, and then choose the appropriate command from the command menu.

Selecting Objects on a Chart

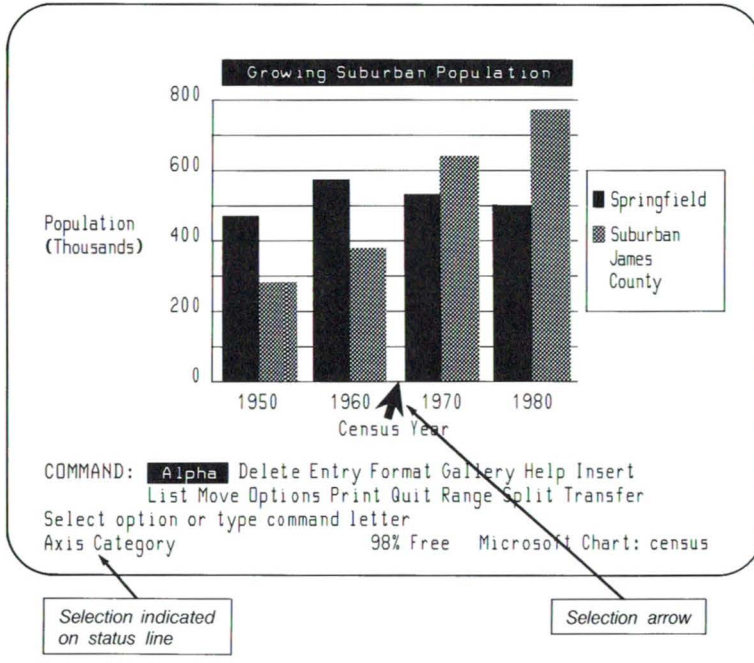
You use the direction keys to select an object. As you press the direction keys, Chart displays the name of the selected object on the far left of the status line. When you select any object other than the entire chart, an arrow appears on the screen pointing to the selected object.

On your screen right now, the entire chart is selected, as indicated by the word "Chart" on the far left of the status line.

Try selecting the other objects on the chart:

1. Press the DOWN key.

   The status line displays "Axis Category," indicating that you have selected the horizontal, or category, axis of the chart. The selection arrow points to the category axis. Below the chart's columns the tick mark labels for the category axis define the categories. In this case, the categories are dates, specifically census years. Categories can also consist of text, such as the names of sales regions, or a series of either sequential or nonsequential numbers.



2. Press the RIGHT key.

   You have selected the vertical, or value, axis. Chart displays "Axis Value" at the left end of the status line.

   Values are the numeric data for each category. The values are shown on the chart by the height of the columns in relation to the scale along the value axis. A category, together with its corresponding value, forms a data point. Each set of related data points forms one data series.

3. Press the LEFT key.

   "Axis Category" is selected again.

4. Press the UP key.

   The entire chart is selected again.

Now that you've used each of the direction keys once, pause for a moment to review the selection process, summarized below in Figure 1.1.

When the Selection is:	Press This Key:	To:
Chart		Select next object
Axis Category		Select next object of same type
Axis Value		Select previous object of same type
Axis Category		Select previous object
Chart		

Figure 1.1. Using Direction Keys to Select Objects

To resume your survey of the chart's objects:

1. Press the DOWN key twice.

   You have selected the Springfield data series. Chart displays "Series/point 1:Springfield" on the status line. The selection arrow moves to the last solid column, indicating that the entire set of solid columns on the chart is selected. Each column represents one data point in the series. The position of a column on the category axis shows a data point's category. The height of a column shows a data point's value.

2. Press the RIGHT key.

   You have selected the Suburban James County data series. Chart displays "Series/point 2:Suburban James County" on the status line.

3. Press the LEFT key.

   You have selected the Springfield series again.

4. Press the DOWN key.

   You have selected the legend. Chart displays "Legend" on the status line. The legend contains the names of each data series in the chart. A legend key shows which pattern represents each data series.

5. Press the DOWN key again.

   You have selected the chart's title. Because the title is a label, Chart displays "Label:Growing Suburban Population" on the status line. The title describes the meaning of the data shown on the chart.

6. Press the RIGHT key.

   You have selected the label for the category axis. Chart displays "Label: Census Year" on the status line. The category axis label describes the significance of the categories, in this case the dates, along the category axis.

7. Press the RIGHT key again.

   You have selected the label for the value axis. Chart displays "Label:Population (Thousands)" on the status line. The value axis label describes the significance of the numbers in the scale along the value axis. In the chart on your screen, the value label also tells you how to read the numbers in the scale (in thousands).

8. Press the DOWN key once more.

   The entire chart is selected once again. The status line displays "Chart," and the selection arrow disappears.

In Chapter 3, you'll apply what you've learned here to actually change the format of a chart. For now, let's examine the data for the two series shown on the chart.

The Entry Screen

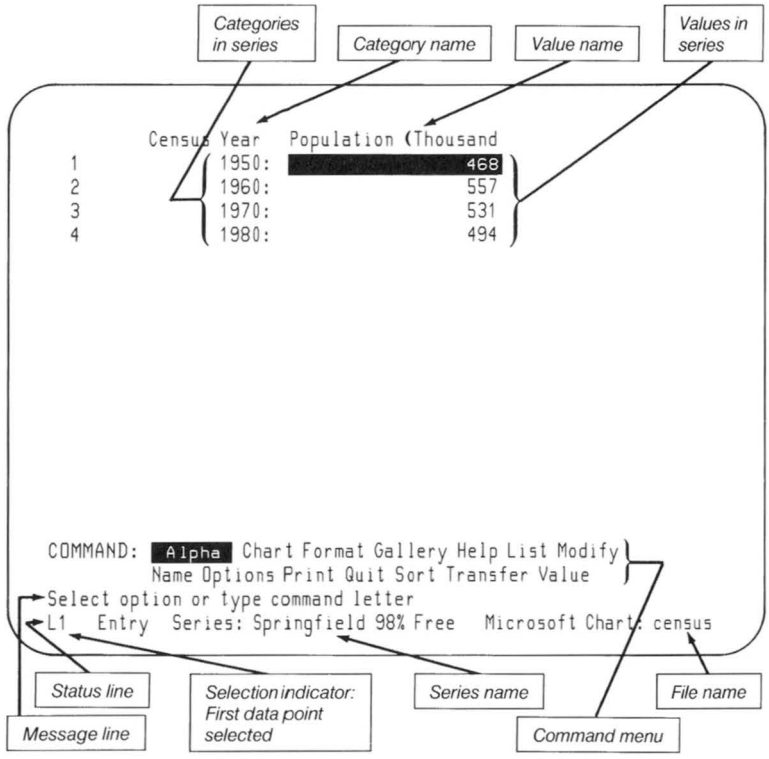
You enter data for a chart using commands from the Entry menu. You can return to the Entry screen at any time to edit the data you've entered.

To view the Entry screen, choose the Entry command. You choose a command by pressing the key of its initial letter.

- Press *E* to choose the Entry command.

  If you pressed a key, such as *J*, that is not the first letter of a command, the command menu will not change, and the message "Not a valid option" will appear. Press *E* to choose Entry.

  If you pressed a key other than *E* that does choose a command, the menu for that command will replace the current menu. Press the CANCEL key to return to the previous command menu. (See "The Keyboard" to locate the CANCEL key on your keyboard.) Then press *E* to choose the Entry command.



On the Entry screen, you enter and edit the data points of a series. Categories are listed on the left, values on the right. The category and value names that head each column are the same as the category and value axis labels on the Chart screen.

Take a look at the command menu. Notice that, just as you can choose the Entry command from the Chart menu, you can choose the Chart command from the Entry menu. This allows you to immediately see the effect on a chart of any data you enter or edit with commands from the Entry menu.

The status line on the Entry screen displays some of the same information displayed on the status lines of the List and Chart screens: the amount of space left for work and the current filename. Other information, however, applies specifically to the Entry screen.

"L1", at the left of the status line, tells you that the value on line 1, the highlighted value, is selected for editing. In the same way you first select an object on the Chart screen before you change it, you select a data point on the Entry screen before changing it.

"Entry" tells you that you are now on the Entry screen. You can now enter new data or edit the data on the screen.

"Series: Springfield" tells you the series containing the data points displayed on the Entry screen.

The Entry screen displays data for one series at a time. To switch between data series, you can use the NEXT SERIES and PREVIOUS SERIES keys. You could find these two keys in "The Keyboard." Instead, take this opportunity to examine Chart's online Help facility.

Getting Help

While working with Chart, you can get help any time you need it. Right now, you need to identify the NEXT SERIES and PREVIOUS SERIES keys on your keyboard.

1. Press *H* to choose the Help command.

   General information on Chart's Help facility appears on the screen. Help has its own menu of subcommands. You choose from these just as you would from a main command menu.

COMMAND: Resume Start Next Previous
Auto-Set Commands Devices Keyboard
Select option or type command letter
L1 Entry Series: Springfield 98% Free Microsoft Chart: census
Help subcommand menu

Some of the subcommands in the menu address important topics; others allow you to move quickly through Help. For example, by choosing *Commands*, you can read about every command used in Chart. Information on commands extends through several screens. By choosing *Next*, you can move from one screenful of information to the next. If you want to review the previous screen, choose *Previous*. *Start* returns you to the beginning of the Help file. You can then select a different topic.

Right now, you're interested in finding information about the keyboard.

2. Press *K* to choose Keyboard.

   A list of keys and their functions appears on the screen, telling you which key to press to carry out a specific action.

   Locate the NEXT SERIES and PREVIOUS SERIES keys on the key map. Once you've identified these keys on your keyboard:

3. Press *R* to choose Resume.

   The Entry screen reappears. Chart returns you to the exact point in your work where you left off to choose the Help command.

Note

For complete details on Chart's online Help facility, see "Getting Help" in Chapter 4.

To view the Suburban James County series:

1. Press the NEXT SERIES key.

   Data for the Suburban James County series appears on the screen.

2. Press the PREVIOUS SERIES key.

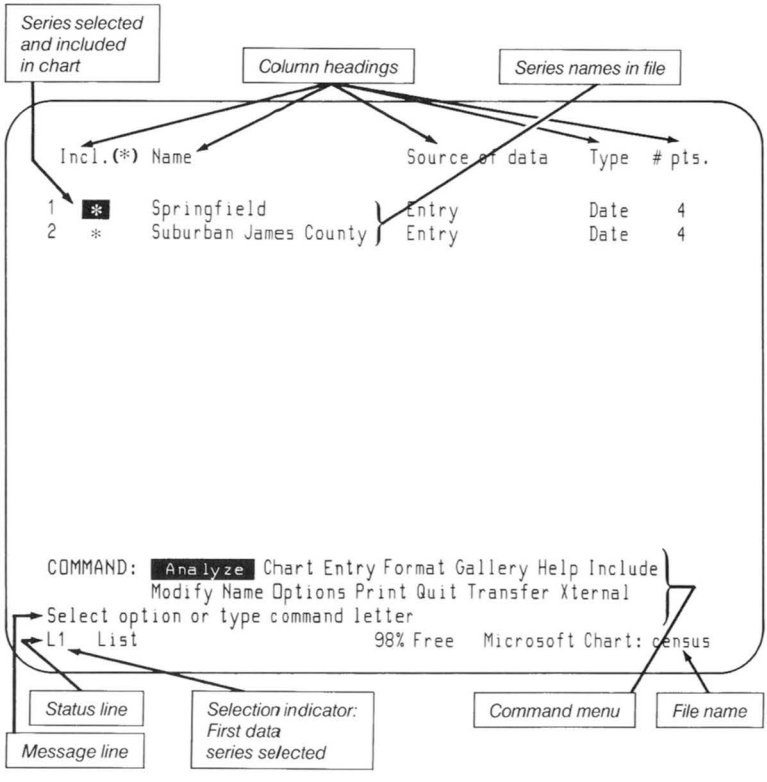
   Data for the Springfield series appears again on the screen.

In the next chapter, you will learn how to enter and edit data with commands from the Entry menu. For now, look at the List screen to see what it tells you about the two series whose data you've just examined.

- Press *L* to choose the List command.

The List Screen

The List is a five-column table of information on the data series you are working with. Headings at the top of the screen tell you what each column contains. Each line of the List contains information about one data series.


Series selected and included in chart
Column headings
Series names in file
Incl.(*) Name
Source of data
Type
pts.
1 * Springfield Entry Date 4
2 * Suburban James County Entry Date 4
COMMAND: Analyze Chart Entry Format Gallery Help Include
Modify Name Options Print Quit Transfer Xternal
Select option or type command letter
L1 List
98% Free
Microsoft Chart: census
Status line
Message line
Selection indicator: First data series selected
Command menu
File name

Column:	Tells you:
Incl.	Which series are included in a chart. Both series currently are marked for inclusion with an asterisk (*). Therefore, Chart included both series in the chart you viewed earlier in this chapter. The highlight in this column indicates the series whose data is selected; the next command you choose will apply to the highlighted data series. Notice that the line number of the selected series appears on the far left of the status line.
Name	The name of the data series on each line of the List.
Source of data	How a data series was created. Both series were previously entered for you from the Entry screen. Therefore, the word "Entry" appears in this column.
Type	The type of data series. The Springfield series and Suburban James County series are both Date series. Other series types are: • Text: words (for example, apples, oranges, pears, plums). • Sequence: numbers in sequence (for example, 1, 2, 3...). • Number: nonsequential numbers (for example, 7, 14, 3, 21).
# pts.	The number of data points in each series.

Take a look at the command menu. You can go directly from the List to the Entry screen to enter or edit data, or to the Chart screen to make or revise a chart.

Selecting Data for Editing

While viewing data on the Entry screen, you learned that you can display data for different series in the List with the NEXT SERIES and PREVIOUS SERIES keys. You can perform a similar action from the List screen; that is, you can select the data you want to see before choosing the Entry command.

1. Make sure you are on the List screen.

   Right now, data in the Springfield series is selected in the List, as indicated by the highlight in the "Incl." column. To select the data in the Suburban James County series:

2. Press the DOWN key.

   The highlight in the "Incl." column moves to the Suburban James County series. Notice that "L1" on the left of the status line has changed to "L2," indicating that the series on line 2 is now selected.

3. Press *E* to choose the Entry command.

   Data for the Suburban James County series appears on the screen.

Note

On the List screen, you can also exclude one or more data series from a chart by typing a hyphen (-) in the "Incl." column of the series you want to exclude. See "Including and Excluding Data Series from a Chart" in Chapter 5.

You're now familiar with Chart's three screens. Figure 1.2 shows the relationship between the data series in the List, the data points displayed on the Entry screen, and a chart of the included data series.

In the next chapter, you will create two new data series, practice entering and editing data, and make your first chart. If you wish to quit Chart before continuing, follow the directions below.

Quitting Chart

To quit Chart from any of the three screens:

1. Press *Q* to choose the Quit command.

2. Type *Y* for Yes in response to the message "Enter Y to confirm."

Because you did not make any changes to your data, you do not need to save the file before quitting. You can repeat this lesson at any time by loading the CENSUS file as you did earlier in this chapter. In the next chapter, you will learn how to save files you create or make changes to.

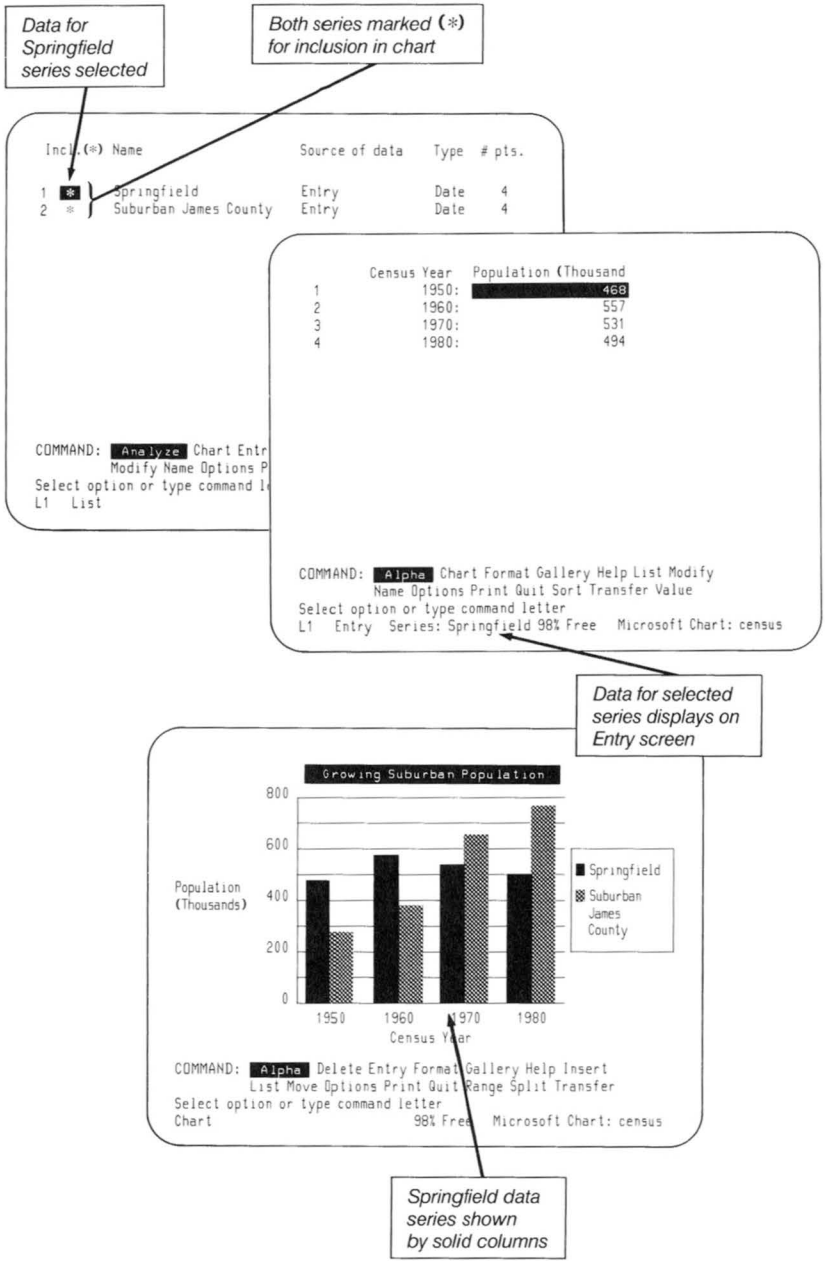


Figure 1.2. The List, Entry, and Chart Screens

Chapter 2
Making Your First Chart

Creating a Data Series 26
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Saving Your Work 45

In Chapter 1, you explored the basics of Microsoft Chart by looking at a file that was already prepared and saved for you on the Program disk. Now you'll create your own chart.

If you quit at the end of Chapter 1, start Chart by typing *chart* at the DOS prompt and pressing the RETURN key. This starts the Chart program and displays an empty List.

If you didn't quit after Chapter 1, return to the List screen. Then remove the CENSUS file from your computer's memory, as follows:

1. Press *T* to choose the Transfer command.

2. Press *C* to choose Clear.

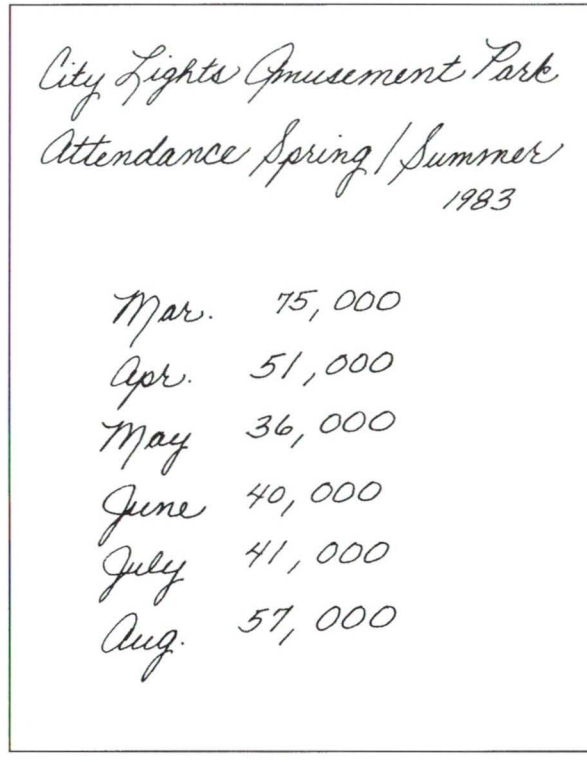
3. Accept the proposed response *All* by pressing the RETURN key.

4. Type *Y* for Yes in response to the message "Enter Y to confirm."

   The Springfield data series and Suburban James County data series are removed from the List, but not from the disk on which they are stored.

Creating a Data Series

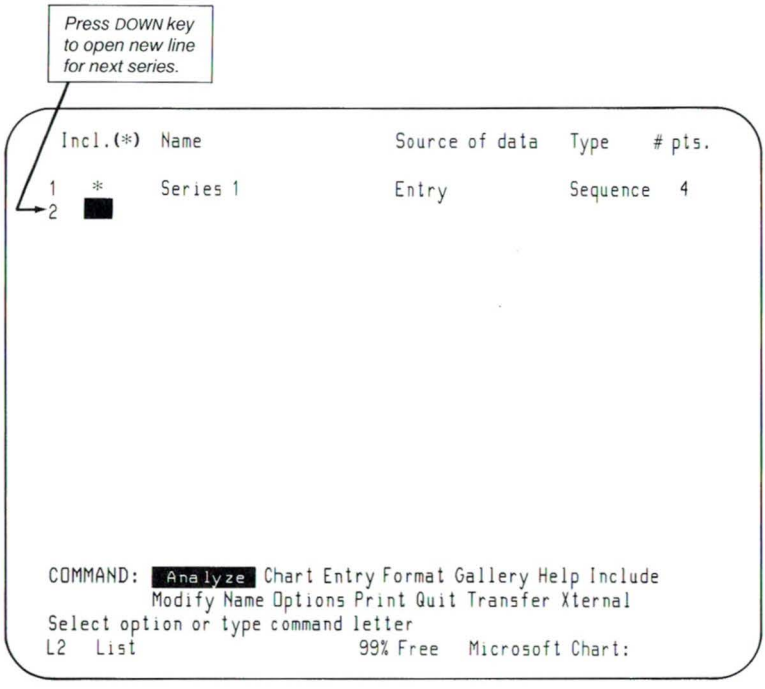
Imagine that you are the owner of City Lights Amusement Park. You have the following attendance figures for the spring and summer months of 1983:



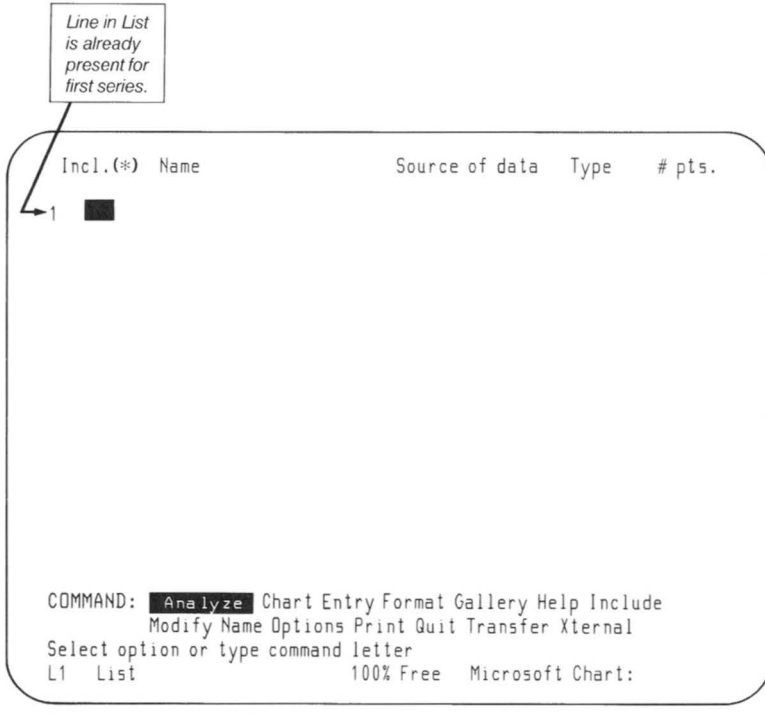
You decide that you would like to make a chart of this information. First, you need to create a data series for the information.

To create a data series you first name the series, name its categories and values, and specify what type of series it is. You do all this with the Name command.

Before creating a series, however, you need to make sure that there is an open line in the List for it. If the List contained one or more data series, you would open the new line by pressing the DOWN key.


Press DOWN key to open new line for next series.
Incl.(*) Name Source of data Type # pts.
1 * Series 1 Entry Sequence 4
2
COMMAND: Analyze Chart Entry Format Gallery Help Include
Modify Name Options Print Quit Transfer Xternal
Select option or type command letter
L2 List 99% Free Microsoft Chart:

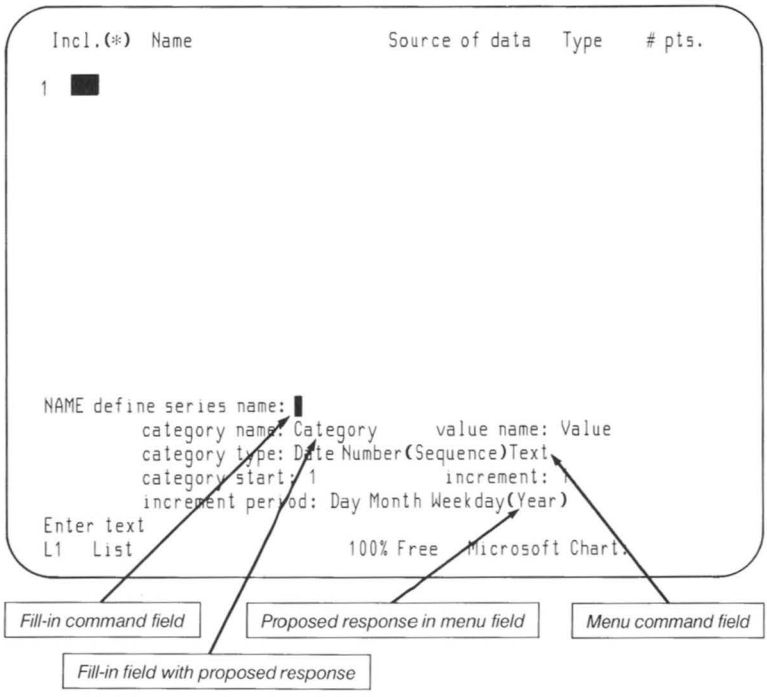
When the List is empty, as it is now, Chart provides the first line for you.



To set up your data series:

1. Press *N* to choose the Name command.

   The Name command fields appear in the lower portion of the List screen. The Name command contains several command fields.



The first command field is the "define series name" field. In this field you type a response, in this case the name you want for the data series.

Type *City Lights*

If you make a mistake, press the BACKSPACE key to erase the character to the left of the highlight. Then type the correct response. Your response in this field will be the title of the chart of this series.

2. Press the TAB key to move to the "category name" field.

   The proposed response in this field is *Category*. You could accept this response by not changing it. However, you probably want to replace the proposed response with a more descriptive category name.

   Type *Month*

   The word "Month" replaces the proposed response. "Month" will be the label for the category axis of the chart of this series.

3. Press the TAB key to move to the "value name" field.

   The proposed response is *Value*. Again, you probably want to type a more descriptive name for this field.

   Type *Attendance*, the label for the value axis of the chart you will make of this series.

4. Press the TAB key to move to the "category type" field.

   This command field contains a menu for you to choose from. You enter a response in this field by pressing the first letter of one of the options, just as you would to choose a command from a command menu. The highlighted option *Sequence* is the proposed response. However, this response is inappropriate because your categories are dates, rather than a sequence of numbers.

   Press *D* to choose Date.

   The highlight moves to the Date option. If you choose the wrong option in a menu field, just press the correct letter key.

5. Press the TAB key to move to the "category start" field.

   The proposed response is the date you typed in answer to the date prompt when you started your computer. Because you are going to chart the attendance at City Lights beginning in March of 1983, you need to replace the proposed response.

   Type *3/83*

   This date will be the first to appear along the category axis of the chart of this series. Based on your responses in the next two command fields, Chart will provide the remaining dates for the category axis.

6. Press the TAB key to move to the "increment" field.

   Because each of your categories differs by one month, there is no need to replace the proposed response of *1*.

7. Press the TAB key to move to the "increment period" field, then press *M* to choose Month.

   Now that you have filled in all the command fields, check to make sure that all your responses are correct. If they aren't, use the TAB key or the BACKTAB key to move to an incorrect response. If the field requires a typed response, type the correction. If the field contains a menu, choose the correct option.

   In Chapter 1, you learned that you carry out a command by pressing the RETURN key. If for any reason you wish to cancel a command instead of carrying it out, press the CANCEL key. Cancelling a command returns you to the command menu from which you chose it. For example, if you were to cancel the Name command now, you would return to the List menu.

8. Press the RETURN key to carry out the Name command.

Now take a look at the List screen to see what you've accomplished so far.

The new series has been added to the List. The series is named and identified as a Date series. The "Source of data" column is blank and the "# pts." column shows "0" because you have not yet entered any data into the series. Entering the data is the next step in preparing to chart your series.

If you later want to change any of the information you've entered in the Name command fields, you can select the series, choose the Name command, and enter new responses in any of the command fields.

Entering Data

You enter data into your series on the Entry screen with the Alpha or Value command.

- Press *E* to display the Entry screen.

  The Entry screen replaces the List screen. The series name appears on the status line. The category name heads one column at the top of the screen, and the value name another.

The first category is already present. Because the series is a Date series, Chart will calculate the categories for you. You need to enter only the values. The value column on the first line is highlighted, awaiting your first entry.

The first value in the series is 75000. This is the number of people that visited City Lights Amusement Park in March of 1983.

To begin entering the first value:

1. Type *7*.

   As soon as you type a number, Chart recognizes that you are entering data and displays the Alpha/Value command field above the message line. This command field accepts either alphabetical characters (text) or numbers. The message line indicates whether text or numbers should be entered. The highlighted area to the right of the command field displays the first number of the value you are currently entering.

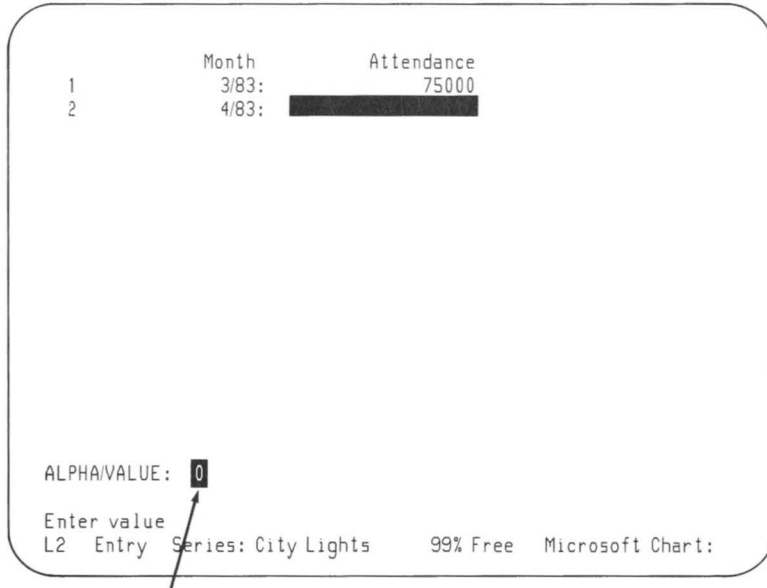
   To finish entering the current value:

2. Type *5000*.

   Do not type a comma between the "5" and the first "0"

3. Press the DOWN key.

   Your first entry appears in the value column at the top of the screen, and Chart adds a second line. The next category has been calculated, and the highlight in the value column awaits your next entry. The Alpha/Value command field contains a proposed response of *0*.


Month
Attendance
1
3/83:
75000
2
4/83:
ALPHA/VALUE: 0
Enter value
L2 Entry Series: City Lights
99% Free
Microsoft Chart:
Enter values in
Alpha/Value command field.

To enter your next value:

1. Type *51000* and press the DOWN key.

   Chart adds a third line for your next value.

2. Enter the following values, pressing the DOWN direction key after each entry: 36000; 40000; 41000.

   To enter your final value:

3. Type *57000* and press the RETURN key.

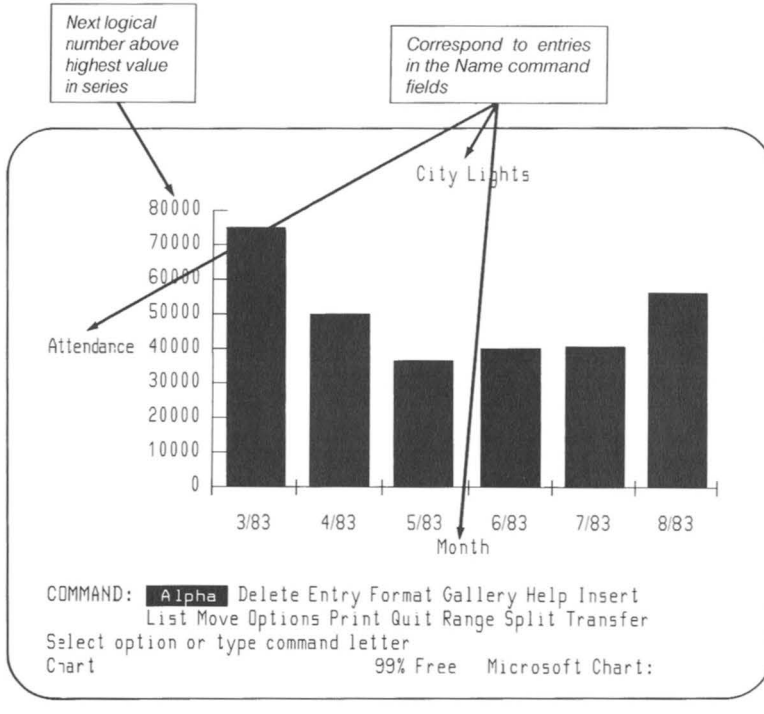
   If you accidentally pressed the DOWN key instead of the RETURN key after entering your final value, you created an additional and unwanted category. To erase the extra category and return to the previous value, press the UP key. Then press the RETURN key to carry out the command.

Note

To enter data in a Text or Number series, where you enter both categories and values, see "Entering Data from the Entry Screen" in Chapter 5.

Now that you've entered data into the series, let's chart it.

- Press *C* to choose the Chart command.



A column chart of the City Lights data series appears on the screen. The chart's title, as well as its category axis label and value axis label, is taken from your entries in the Name command fields. Its categories are those that Chart calculated for you when you entered your data. Values along the value axis range from zero to the next logical number above the highest value in the series.

Suppose you would like to see what percentage of the total attendance at City Lights each month represents. For this, you need a different type of chart.

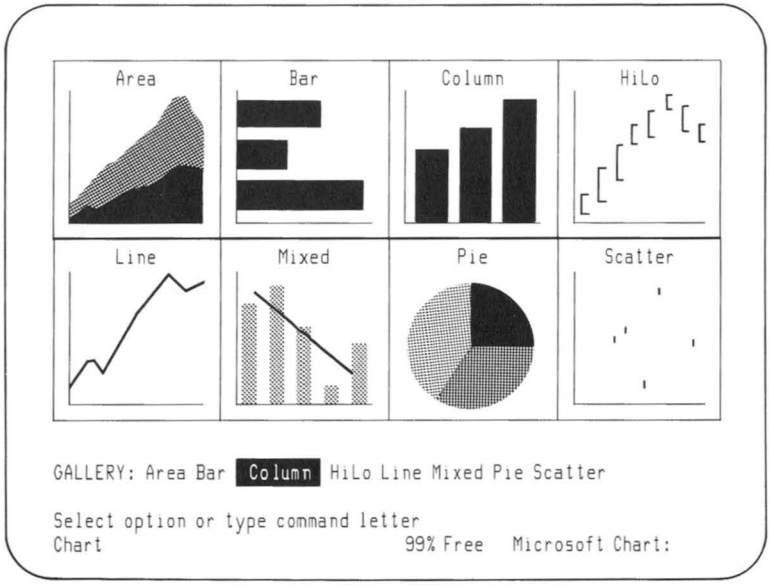
Choosing a Chart Type

The basic chart types are displayed in the Gallery.

1. Press *G* to view the Gallery.

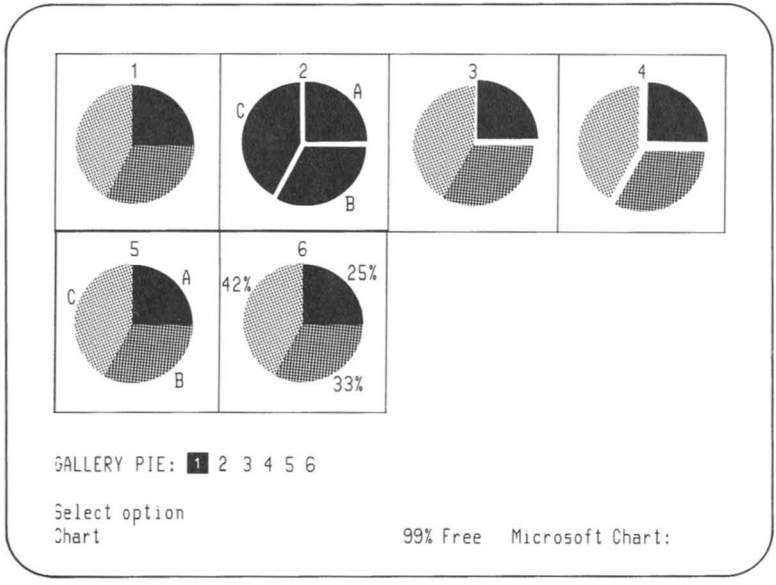
   The Gallery shows eight basic chart types: area, bar, column, hi-lo, line, mixed, pie, and scatter. Each type (except hi-lo) has a gallery of its own, showing several varieties of the type displayed in the main Gallery.

   You choose a particular type of chart depending on the nature of your data. In our example, a pie chart is good for representing the percentages of the total. After you choose a chart type, choose from the individual gallery to emphasize your data in a particular way.



2. Press *P* to choose the pie gallery.

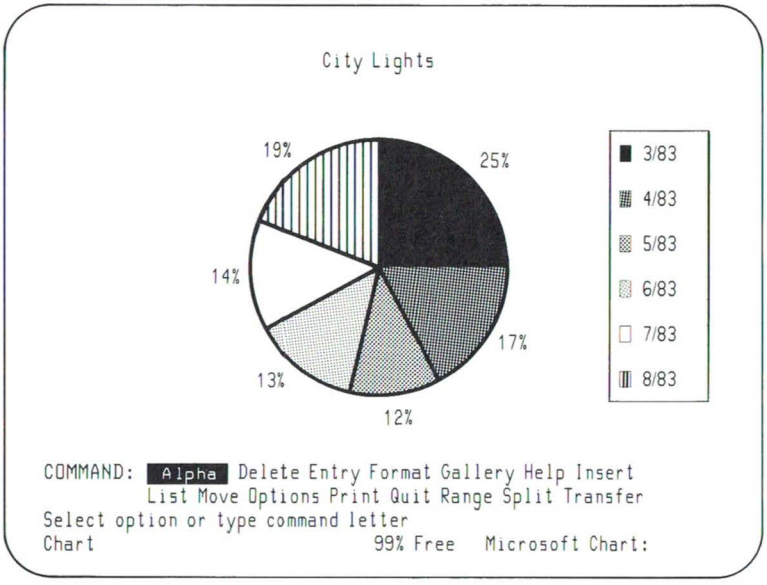
   Option 6 labels each data point, or wedge, as a percentage of the whole.



3. Press *6* to choose option 6.

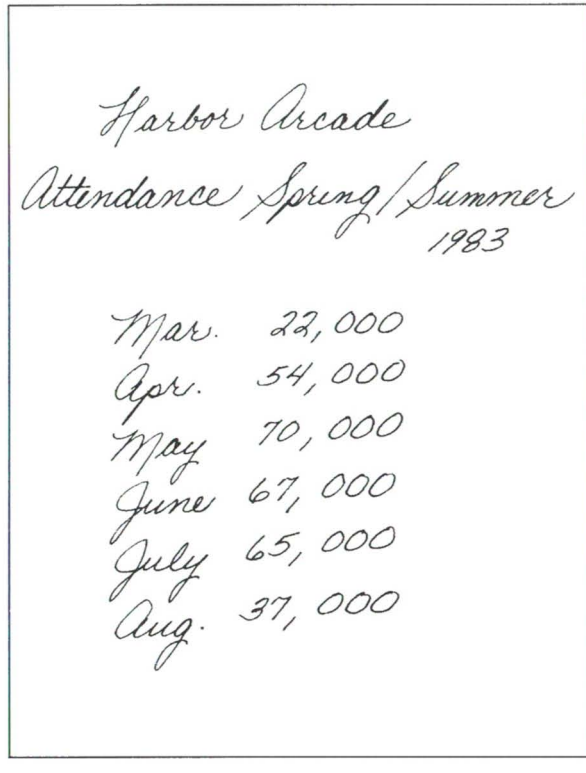
   The City Lights data series appears on the Chart screen as a pie chart with percentage labels.

   The option you chose gives each wedge in the pie chart a different pattern. The chart also contains a legend that matches each patterned wedge with the category it represents.



Creating a New Series by Copying

Suppose that you also have monthly attendance figures for the same period for Harbor Arcade, your main competition. You can make a chart that compares the figures for Harbor Arcade to those for City Lights.



First you create a new series for the Harbor Arcade data. As before, you could describe the new series with the Name command. However, the new series will be very similar to the one you've already created for the City Lights data. It will be the same type of series, and the category and value names will be the same. Only the names and the data for the two series will differ. Therefore, you can save time by copying the City Lights series and editing it to change its name and data.

1. Press *L* to choose the List command and view the List screen.

2. To copy the City Lights data series, press *M* to choose the Modify command.

3. Press *C* to choose Copy.

   The proposed response, *1*, in the "series in line" field is the number of the series selected in the List. Since you will copy series 1, you don't have to change the proposed response.

4. Press the RETURN key.

   Chart adds line 2 and the name of the new series, "Copy of City Lights," to the List. The source of the new series is identified as "Copy" rather than "Entry." The highlight in the "Incl." column indicates that the new series is selected.

Note

For other ways to create a new series from an existing one, see "Creating New Data Series from Old Series" in Chapter 5.

Your next step is to give the new series an accurate name:

1. Press *N* to choose the Name command.

   The Name command fields appear in the lower portion of the List screen. The "define series name" field is highlighted.

2. Type *Harbor Arcade*

   "Harbor Arcade" replaces the current series name, "Copy of City Lights."

3. Press the RETURN key.

   The new series name appears on line 2 of the List.

The Harbor Arcade series still contains a copy of the data from the City Lights series. Your next step is to enter the correct data for the new series in the Alpha/Value command field.

1. Press *E* to go to the Entry screen.

2. Use the UP key to return the highlight to the first value.

   "L1" will appear on the far left of the status line, indicating that the first value is selected.

   The values for the Harbor Arcade data series are: 22000; 54000; 70000; 67000; 65000; and 37000. Enter these values in the same way that you did for the City Lights series. As before, the Alpha/Value command field will appear above the message line when you enter the first number of the first value.

3. Type the new values, pressing the DOWN key after each one except the last.

   As you enter the new values, notice that they replace the values from the original series. After you have typed the last value:

4. Press the RETURN key.

You are now ready to chart the City Lights series and the Harbor Arcade series together, and compare the two.

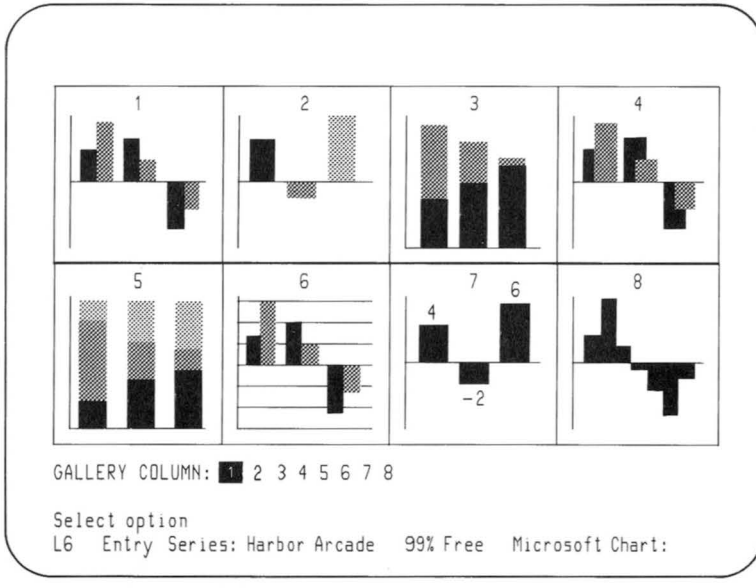
Chart remembers the last format you used to chart a data series. Your last format, a pie chart, can chart only one data series. Therefore, although the List shows both series marked for inclusion in a chart, if you were to choose the Chart command now, a pie chart of only the first series would appear on your screen. Because you are charting two series, you need to choose a new format. To do so, return to the Gallery.

1. Press *G* to choose the Gallery command.

   When you created the City Lights data series, you wanted to compare monthly attendance figures at a single amusement park. Now you want to compare the monthly attendance figures of two amusement parks. A column chart will serve your purpose well.

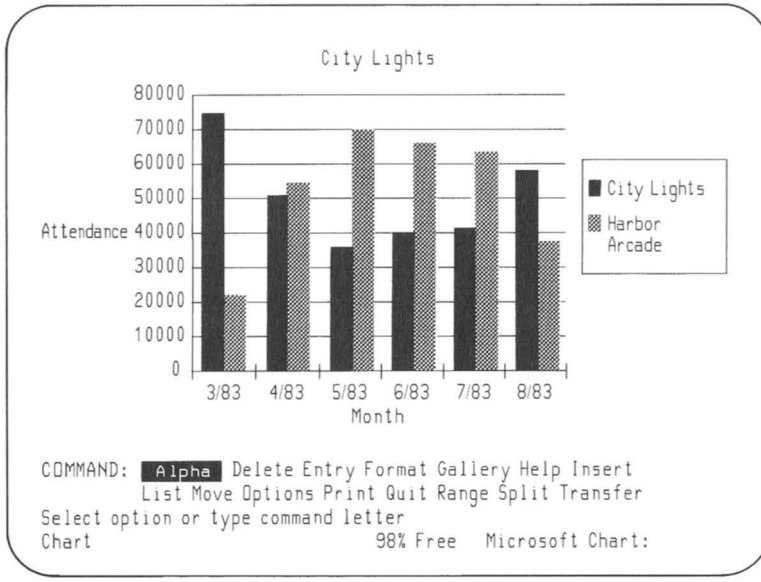
2. Press *C* to choose the Column gallery.

   The column gallery contains eight types of column charts. Options 1 and 6 both would be good to show the type of comparison you want to make. The only difference between the two is that option 6 has grid lines along the value axis, making it easier to judge the values shown by each column.



3. Press *6* to choose option 6.

The chart you want appears on the screen. Because there is more than one series on the chart, a legend identifies the patterns used for each series.



So far you've done all of your chart formatting from the galleries. Among the eight basic types of chart in the main Gallery, Chart offers 45 variations to choose from. You'll usually find a chart among the galleries that provides the format you need to effectively display your data.

You may, however, want to tailor a chart format beyond what the galleries offer. Chapter 6, "Making and Revising Charts," introduces you to Chart's powerful formatting capabilities. You'll learn how to customize your charts to create the exact chart you want.

Saving Your Work

Before quitting this session, you should save the data and chart you've created. You save your work in a file on the Program disk with the Transfer Save command. You can choose this command from any of Chart's three screens.

1. Press *T* to choose the Transfer command.

2. Press *S* to choose Save.

3. Type *parks* in the "filename" field.

4. Press the RETURN key.

   Both data series and the last chart you made are saved in the PARKS file on your Program disk.

If you want to quit Chart before going on to Chapter 3:

1. Press *Q* to choose the Quit command.

2. Type *Y* for Yes in response to the message "Enter Y to confirm."

Chapter 3
Revising Your Chart

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With the basic formats in the galleries, you can redesign your charts to create many different formats. You can also use formatting commands from the menu on the Chart screen, to change the color, pattern, position, or size of any part of a chart. You can add tick marks, frames, labels, arrows, grid lines, and many other details.

In this chapter, you'll learn a few of the many formatting options available to you in Chart. Chapter 6, "Making and Revising Charts," contains complete procedures for formatting the charts you make.

If you quit at the end of Chapter 2, you can resume by typing *chart parks* at the DOS prompt and pressing the RETURN key.

Chart loads the PARKS file for you and displays the Chart screen rather than the List screen. You are now at the exact point in your work where you left off when you quit Chapter 2.

Changing the Chart's Title

In the last chapter, when you included both data series in the chart, you may have noticed that the chart's title was no longer accurate. When more than one data series is included in a chart, the title is taken from the first series marked for inclusion in the List. Therefore, the chart's current title was taken from the City Lights series. You can change the labels on a chart, including the title, with the Alpha command.

When you change the title's text, an additional change will help refine your chart. Take a look at the tick mark labels for the category axis. Because all six months fall within the same year, you don't need to show the year in each of the tick mark labels. The year need only appear once on the chart, and the title is a good place for it. Later in this chapter, you'll learn how to remove the year from the tick mark labels.

Remember that, when changing any of a chart's objects, you first select the object.

1. Press the DOWN key until the status line indicates that you have selected a label.

   Following the word "Label" will be one of the label names listed below:

   Master series/point
   Master value
   Month
   Attendance
   City Lights

Note

"Master series/point label" and "master value label" are discussed in "Master Objects" in Chapter 6, "Making and Revising Charts."

---

2. Press the RIGHT key until the title label, "City Lights," is selected.

3. Press *A* to choose the Alpha command.

   The Alpha command replaces the Chart command menu. The chart's title is highlighted to the right of the command.

4. Type *Popularity of Amusement Parks*

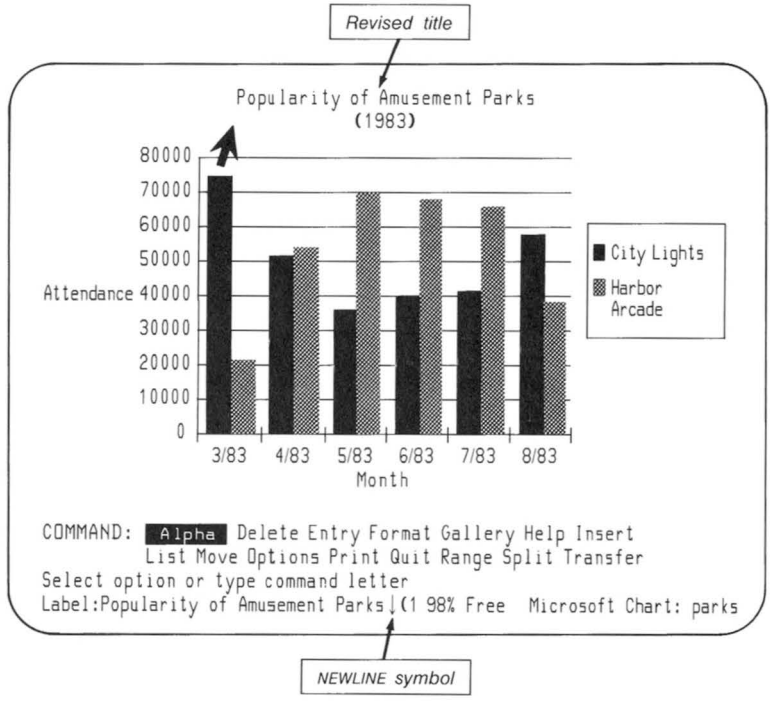
   The year would look nice centered one line below the title. To put the year on the next line:

5. Press the NEWLINE key. A new line in the Alpha command is indicated on the screen by the symbol "↓" See "The Keyboard," or choose *Keyboard* in the Help subcommand menu, to identify the NEWLINE key on your keyboard.

6. Type *(1983)*

7. Press the RETURN key.

When Chart redraws the screen, the new title appears on the chart with the year centered on the second line.



Next, let's explore a simple formatting procedure that will add new meaning to the data shown on your chart.

Adjusting an Axis

It's easy to see from the current chart which amusement park had better attendance during any given month. However, suppose you are interested in comparing the monthly attendance at both amusement parks relative to the average monthly attendance at your own, City Lights.

City Lights averaged 50,000 visitors per month. You can emphasize the attendance of both amusement parks relative to this average by moving the category axis to the 50000 level of the value axis. Because this change will affect the range of numbers (the scale) along the value axis, you will use the Range command.

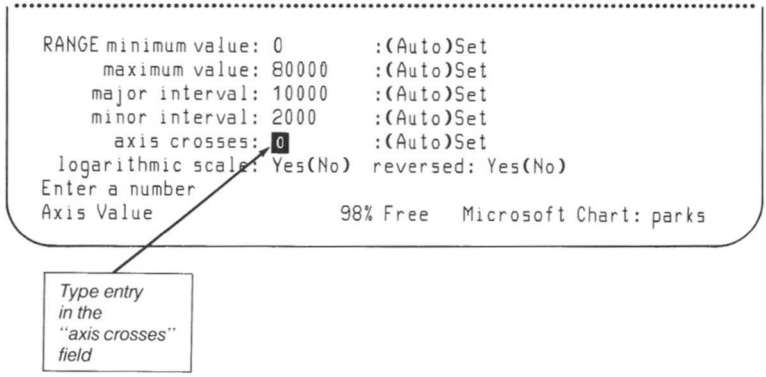
The scale is part of the value axis. Therefore, your first step is to select the value axis.

1. Press the DOWN key until the status line indicates you have selected either "Axis Value" or "Axis Category."

2. If you selected "Axis Category," press the RIGHT key to select "Axis Value."

3. Press *R* to choose the Range command.

4. Press the TAB key until the "axis crosses" field is highlighted.


RANGE minimum value: 0 :(Auto)Set
maximum value: 80000 :(Auto)Set
major interval: 10000 :(Auto)Set
minor interval: 2000 :(Auto)Set
axis crosses: 0 :(Auto)Set
logarithmic scale: Yes(No) reversed: Yes(No)
Enter a number
Axis Value 98% Free Microsoft Chart: parks
Type entry in the "axis crosses" field

5. Type *50000*

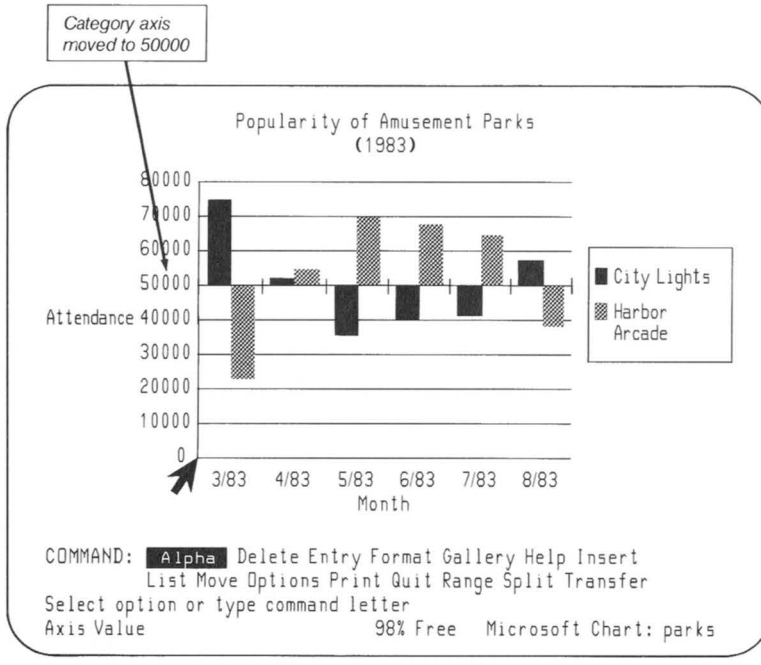
Note

As you type your entry, the field to the right of the "axis crosses" field changes from *Auto* to *Set*. Throughout Chart, many command fields have an accompanying Auto-Set field. Before you typed the above entry, Chart automatically chose a response of *0* in the "axis crosses" field. However, when you typed the above entry, you set the "axis crosses" field at *50000*. For a detailed explanation of Auto-Set command fields, see "Auto-Set Fields" in Chapter 6.

---

6. Press the RETURN key.

The revised chart appears on the screen.



The columns now start at the 50000 level. Because of the change to the axis, the chart now emphasizes three things:

1. You can tell how much better than average a good month is by how far above the 50000 level a column extends, or how much worse than average a bad month is by how far below the 50000 level the column extends.

2. City Lights has good months whenever Harbor Arcade has bad months, and vice versa.

3. Except for April, the amount by which one amusement park is above average is roughly equal to the amount the other area is below average.

Now the chart shows the emphasis you want, but you can make it look even better.

Changing a Pattern

Chart allows you to change many aspects of a chart's appearance, for example, the pattern and color of objects. The two patterns for the columns on your current chart were automatically determined by Chart to be Solid and Dense.

To heighten the contrast between the two sets of columns, let's make the pattern of the second set Medium instead of Dense. First you'll select the series on the Chart screen, and then change its pattern with the Format Pattern command.

1. Press the DOWN key until the status line indicates that you have selected a series/point.

   Following the phrase "Series/point:" one of the following series names will appear:

   Series/point:Master
   Series/point 1:City Lights
   Series/point 2:Harbor Arcade

2. Press the RIGHT key until you have selected "Series/point 2: Harbor Arcade."

3. Press *F* to choose the Format command.

4. Press *P* to choose Pattern.

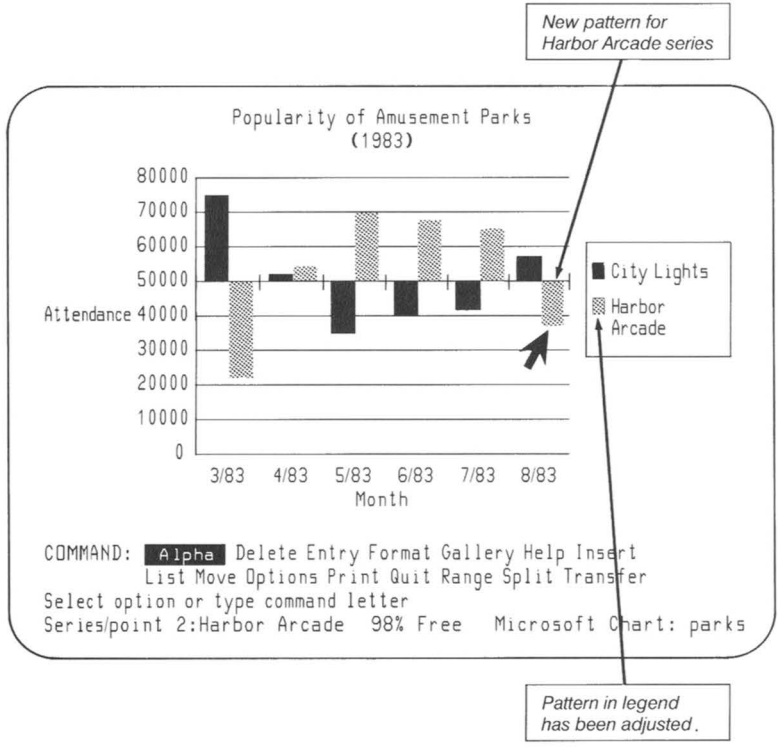
   Notice that *Dense* is currently selected in the highlighted "area" command field. In a fill-in command field such as this, you can either type a valid response or press the direction keys to step through a list of available responses.

5. Press the RIGHT key until *Medium* appears in the "area" command field.

   Notice that when you first press the RIGHT key, the response in the accompanying Auto-Set field changes from *Auto* to *Set*.

6. Press the RETURN key.

   The chart reappears on the screen with the pattern of the second series' columns changed to Medium. The pattern in the legend for the Harbor Arcade series is adjusted to match the new pattern of the series' columns.



Note

See the Format Pattern command in Chapter 9, "Command Directory," for samples of all patterns used in Chart.

Moving the Legend

Chart allows you to change the position or size of a legend, a label, or the plot area. The height of the value axis and the length of the category axis define the plot area. You can also change the size of the frame around a chart, a label, or a legend.

When you first charted the City Lights data series, Chart automatically determined the type of chart and the position and size of its parts. When you added the Harbor Arcade data, Chart added a legend, also determining its position and size. At the same time, Chart reduced the size of the plot area, as well as the size of the columns within the plot area, to make room for the legend.

When you changed the position of the category axis, you opened free space on the chart below the 20000 level of the plot area. You can now use that space for the legend.

Let's move the legend to the lower right portion of the plot area. Doing so will automatically increase the size of the chart's plot area.

To move the legend, you can use the following keys:

Key	Action
UP	Moves up slightly
PAGE UP	Moves up more
DOWN	Moves down slightly
PAGE DOWN	Moves down more
LEFT	Moves left slightly
PAGE LEFT	Moves left more
RIGHT	Moves right slightly
PAGE RIGHT	Moves right more

When you press any of the above keys after choosing the Move command, the legend's frame will move in the direction you indicate. See "The Keyboard" or choose *Keyboard* from the Help subcommand menu, to identify the page keys on your keyboard.

1. Press the DOWN key until you select the legend.

   Chart will display "Legend" at the left of the status line.

2. Press *M* to choose the Move command.

3. Press the PAGE DOWN or DOWN key until the legend's frame is positioned where you want it below the category axis. If you move it too far down, use the PAGE UP or UP key to adjust its position.

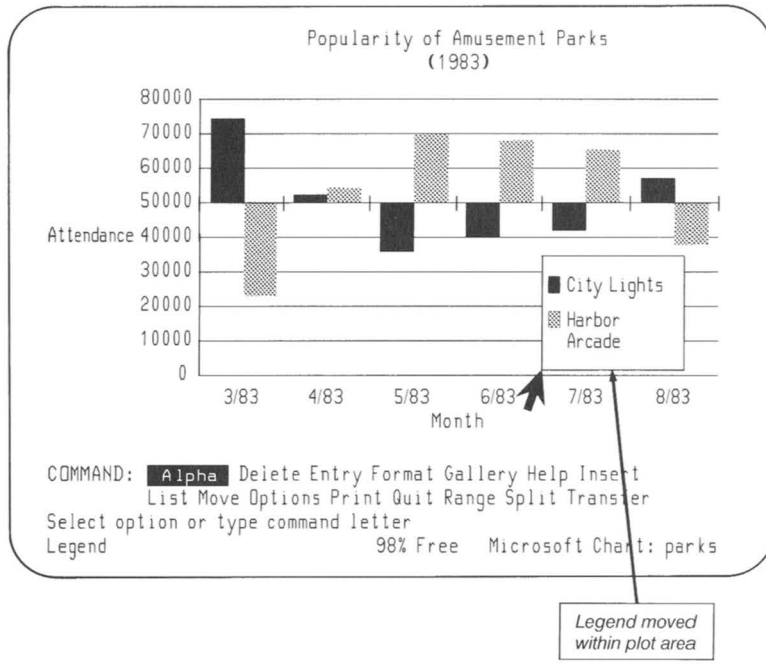
4. Press the PAGE LEFT or LEFT key until the frame is positioned away from the right border of the plot area. If necessary, adjust its position with the PAGE RIGHT or RIGHT key.

5. Press the RETURN key.

   Chart redraws the chart, moving the entire legend and adjusting the size of the plot area.

Because the plot area has expanded to the right, the legend is probably positioned farther to the left than you intended. To readjust the legend's position, choose the Move command again and use the PAGE RIGHT or RIGHT key to position the legend's frame exactly where you want it. Press the RETURN key to carry out the command.

Your chart should now look something like this:



Depending upon how far you moved the legend in any direction, it may now crowd or obscure other parts of the chart. If so, you can reduce the height of the legend to improve the chart's appearance.

The legend itself would look better if the series name "Harbor Arcade" fit on a single line. You can make room for the entire series name on a single line by widening the legend.

However, before changing the legend's size, let's explore an option that allows you to carry out formatting commands more quickly.

Controlling Redraw

When you carry out a formatting command, the entire chart is redrawn. If you want to make several changes to a chart and don't need to see the chart at each intermediate step, you can save time by turning off the "redraw chart" field of the Options command.

1. Press *O* to choose the Options command.

2. Press *N* to choose No in the "redraw chart" field.

3. Press the RETURN key.

Now you can work more quickly as you continue to revise the chart. You can turn the redraw option back on at any time you wish. Also, you can press the REDRAW key to redraw the chart at any time.

Changing the Legend's Size

Because Chart will not redraw the chart until you press the REDRAW key, you can now finish formatting the legend more quickly. To adjust the legend's size, use the same keys you used to adjust its position.

Key	Action
UP	Increases height slightly
PAGE UP	Increases height more
DOWN	Decreases height slightly
PAGE DOWN	Decreases height more
LEFT	Decreases width slightly
PAGE LEFT	Decreases width more
RIGHT	Increases width slightly
PAGE RIGHT	Increases width more

As you press any of the above keys, the legend's frame will increase or decrease in size, much as its position changed when you were using the Move command.

The legend is still selected for formatting. To change the legend's size:

1. Press *F* to choose the Format command.

2. Press *S* to choose Size.

   The "width" field of the Format Size command is currently selected.

3. Press the PAGE RIGHT or RIGHT key until the legend's frame is the width you want. If necessary, press the PAGE LEFT or LEFT key to adjust its width.

4. Press the TAB key to move to the "height" command field.

5. Press the PAGE DOWN or DOWN key until the frame is the height you want. If necessary, press the PAGE UP or UP key to adjust its height.

6. Press the RETURN key to carry out the Format Size command.

The chart is not redrawn this time because you've turned the redraw option off. Nonetheless, by looking at the legend's frame, you can tell that its new size has slightly altered its position. Use the Move command if you want to adjust the legend's position.

Choosing a New Frame Type

You can further change the legend by choosing a different frame type with the Format Type command. You can choose any of the frame types shown in Figure 3.1.

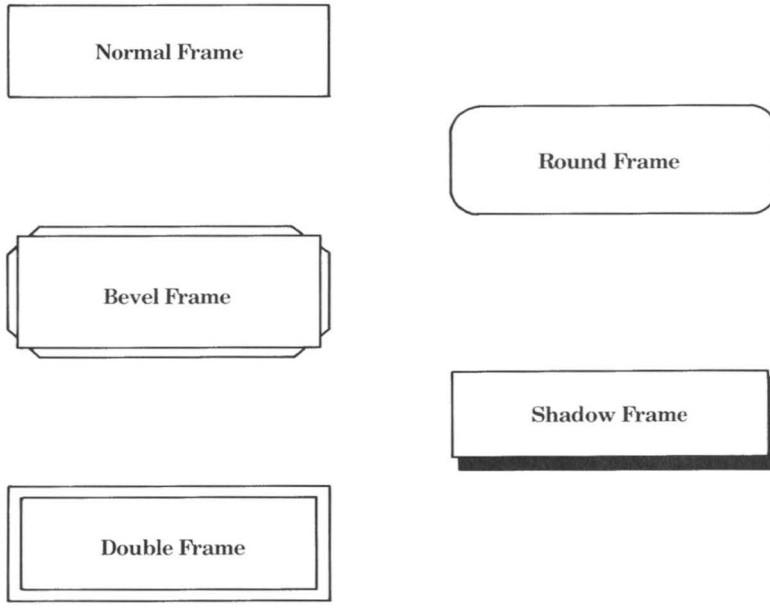


Figure 3.1. Frame Types

Right now, the legend's frame is Normal. See what a shadowed frame will look like.

1. Press *F* to choose the Format command.

2. Press *T* to choose Type.

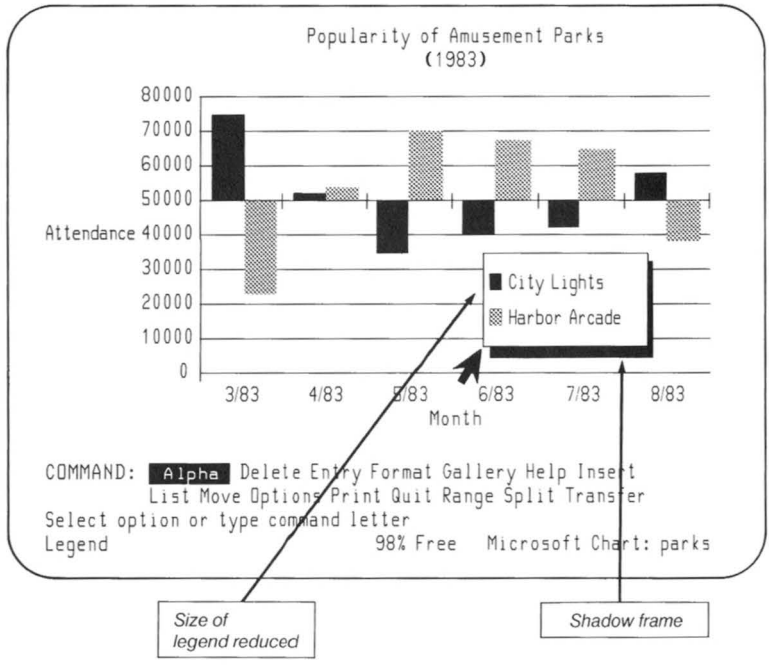
3. Press the TAB key to move to the "frame type" field.

4. Press *S* to choose Shadow and press the RETURN key.

   To see the effect of the last two formatting changes you've made:

5. Press the REDRAW key.

   See "The Keyboard" or choose *Keyboard* from the Help subcommand menu to identify the REDRAW key on your keyboard.



Formatting the Data on Your Chart

So far, you have formatted objects on your chart with formatting commands from the Chart command menu. You can also change the appearance of the data on your chart with formatting commands from the List and Entry menus.

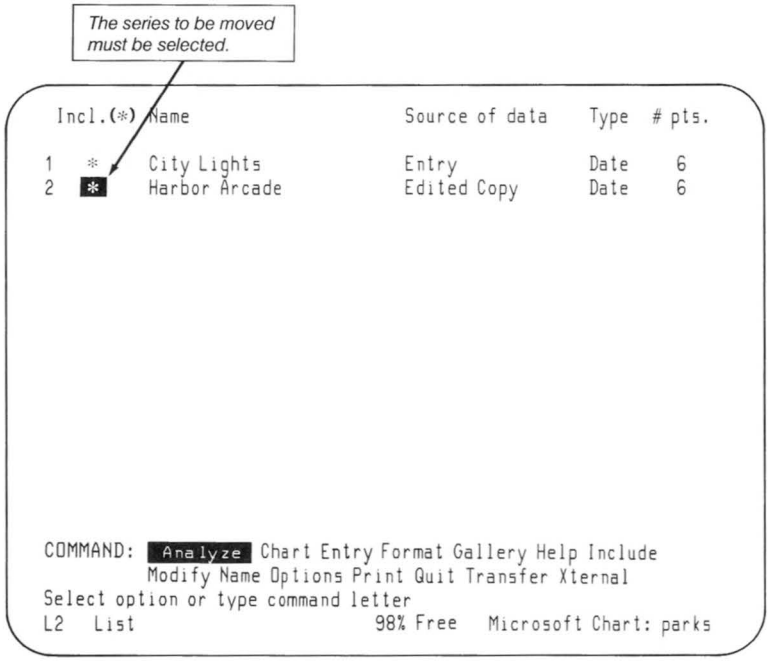
Changing the Order of Data Series

Frequently, you will change the order of data series in a chart to emphasize a particular series. For example, you can emphasize the popularity of Harbor Arcade over that of City Lights by reversing the columns in the chart of the two series.

Data series appear in the chart in the order that they appear in the List. Therefore, to change the order of the series in a chart, you use the Modify Move command to change their order in the List.

- Press *L* to return to the List screen.

On the List screen, you first select the series you want to work with, just as you select an object on the Chart screen or a data point on the Entry screen, before taking further action. Therefore, your first step is to select the series you want to move. Right now, the Harbor Arcade series is selected. Since this is the series you will move, you don't have to change the selection.



1. Press *M* to choose the Modify command.

   The Modify subcommand menu replaces the List menu.

2. Press *M* to choose Move.

   The Modify Move command fields appear. In command fields, you specify further instructions before carrying out a command. Some command fields, such as those now on the screen, contain proposed responses. A proposed response is based on your most recent use of a command or the current status of the program. You can replace a proposed response with your own response.

The "from line" field contains a proposed response of *2*. Because you will move the series on line 2 of the List, you do not need to replace the response.

To move from one command field to the next, you press the TAB key.

3. Press the TAB key to move to the "to before line" field.

   This field also contains a proposed response of *2*. Because you want to move the series from line 2, you need to replace this response.

4. Type *1*.

   You have now told Chart that you want to reverse the positions of the series in the List; that is, you want to move the series on line 2 to before the series on line 1.

   The "# of series" field contains a proposed response of *1*. Because you want to move only one series, you do not need to replace the response.

5. Press the RETURN key.

   The positions of the two data series are reversed in the List.

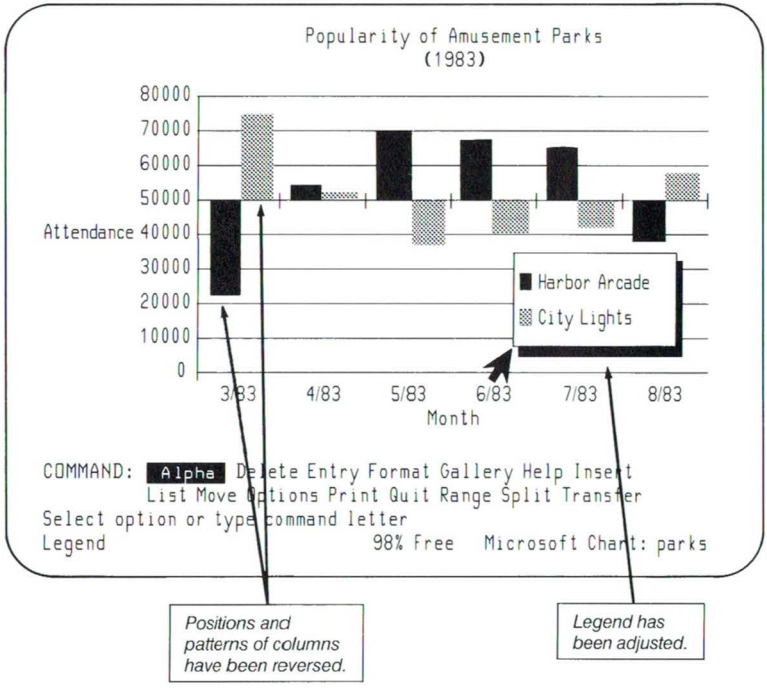
To see the effect of the Modify Move command on the chart, you need to first turn the redraw option in the Options command back on. Otherwise, when you choose the Chart command to see the changes, the Chart screen will be blank until you press the REDRAW key.

1. Press *O* to choose the Options command.

2. Press *Y* to choose Yes in the "redraw chart" field.

3. Press the RETURN key.

4. Press *C* to choose the Chart command.



Not only the positions of the columns, but also their patterns, have been reversed in the chart. Chart gives the first series marked for inclusion in the List a Solid pattern, and the second a Dense pattern.

Also, the legend in the chart has been adjusted to describe the new position and pattern of each series.

Changing the Tick Mark Labels

Because you added the year for your data to the chart title, you don't need to show the year in the tick mark labels for the category axis. You can remove the year from the tick mark labels with the Format Category command. However, the remaining sequence of numbers (3 through 8) along the category axis will no longer clearly indicate months; you can also use the Format Category command to change the format of the months in the tick mark labels.

You can choose the Format Category command from either the Entry menu or the List menu. On the Entry screen, however, you can immediately see the effect of the changes you make.

1. Press *E* to return to the Entry screen.

2. Press *F* to choose the Format command.

3. Press *C* to choose Category.

4. Press the TAB key until the highlight moves to the "date format" field.

   This field contains three options: *Short*, *Medium*, and *Long*. If you're not sure what these choices mean, you can find out more about them by checking the Help information.

Note

In Chapter 1, you learned how to choose the Help command from any of Chart's three screens to display general information about Chart. You can also get help with a particular command or command field by using the HELP key. See "The Keyboard" or choose *Keyboard* from the Help subcommand menu to identify the HELP key on your keyboard.

1. Press the HELP key. The Help information shows you that the Medium format produces the common three-letter abbreviation of the month names. Also, the response in the "show year" field controls whether the year appears in the category labels.

2. Press *R* to resume your work. Chart returns you to the "date format" command field of the Format Category command.

To continue formatting the tick mark labels:

1. Press *M* to choose Medium.

2. Press the TAB key to move to the "show year" field, and press *N* to choose No.

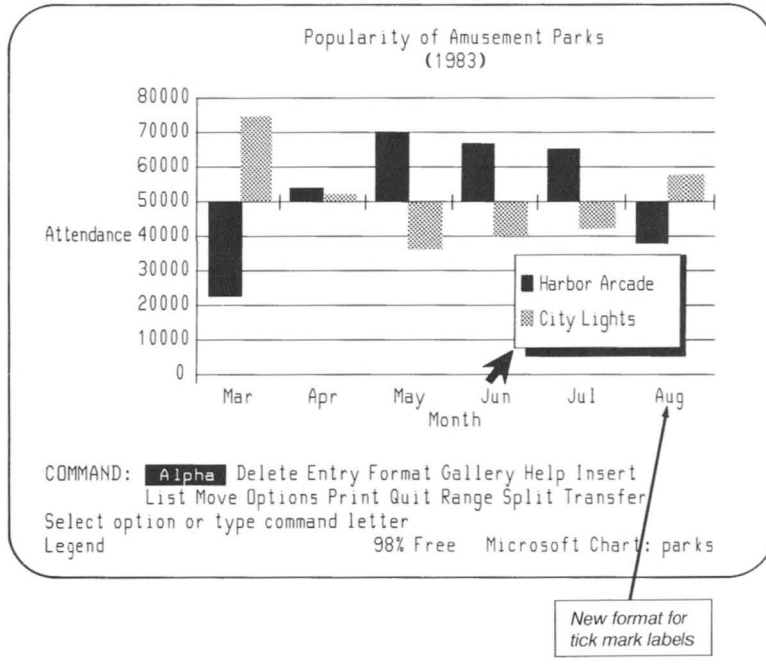
3. Press the RETURN key.

   Chart adjusts the dates in the category column according to your specifications. Your next step is to change the tick mark labels for the categories in the other data series in the chart.

4. Press the NEXT SERIES key.

Repeat the procedure for the next series in the chart: Choose the Format Category command; choose *Medium* in the "date format" field; choose *No* in the "show year" field; press the RETURN key.

To see your finished chart, press *C* to choose the Chart command. The finished chart appears on your screen.



Now save your data and chart as you did after Chapter 2:

1. Press *T* to choose the Transfer command.

2. Press *S* to choose Save.

   The filename PARKS is the proposed response in the "filename" command field.

3. Press the RETURN key.

4. Type *Y* for Yes in response to the message "Enter Y to overwrite file."

If you would like to print your chart, see Chapter 8, "Saving and Printing Charts."

Note

You do not need to remove the selection arrow from the Chart screen before printing. The selection arrow does not print on a chart.

Depending on the kind of printer or graphics plotter you have, the printed chart may differ slightly from the chart on your screen.

A Selection of Sample Formats

Before quitting this session, you might like to look at some example Chart files that have been included on your Program disk. These illustrate the wide variety of formats, including some multiple chart formats, that you can produce with Chart.

The first example file is named EXAMPLE1.MC. The others are similarly named, and numbered sequentially (EXAMPLE2.MC, EXAMPLE3.MC). You will find these files listed in the directory. To look at the directory and choose a file from it, use the Transfer Load command.

To load the first example file:

1. Press *T* to choose the Transfer command.

2. Press *L* to choose Load.

3. Press any direction key.

   The directory appears on the screen.

4. Use the direction keys to highlight the file EXAMPLE1.MC.

   The filename EXAMPLE1.MC appears in the "filename" field of the Transfer Load command.

5. Press the RETURN key.

   The first sample chart appears on the screen. After viewing the first sample chart, load the next file.

When using the Transfer Load command, you can:

- Load both data and format from a file by choosing *All* in the "load" field

- Load only data to apply to a new format by choosing *Data* in the "load" field

- Load only the format to apply to new data by choosing *Format* in the "load" field

Chart's ability to load formats only is especially important because it allows you to apply your favorite formats to as many new data series as you like. This means that you can create your own collection of formats and keep it on a disk for future use. For details, see "Saving and Reusing Chart Formats" in Chapter 6.

In Part 1, "Learning Chart," you learned the basics of making charts. The rest of this manual will explain the full range of Chart's extensive capabilities.

Part 2, "Using Chart," contains complete procedures for doing specific charting tasks. You might want to begin looking through Part 2 to familiarize yourself with its organization and content. Then, using the table of contents and the index, you can discover how to make and revise charts for all of your charting needs.

Part 3, "Reference to Chart," contains detailed information on commands and messages. Chapter 9, "Command Directory," discusses all commands used in Chart. Chapter 10, "Message Directory," lists all messages appearing in Chart, and discusses the actions you should take in response to them.

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Using Chart

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Chapter 4
Using Commands

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In Part 1, "Learning Chart," you learned the basics of Chart by performing a series of exercises. Part 2, "Using Chart," will help you create your own charts.

As you read through Part 2, we suggest you refer to Chapter 9, "Command Directory" for detailed explanations of each command. It will be helpful as you explore the specifics of making your own charts.

This chapter explains how to choose and carry out commands. You design and produce a chart by following a simple series of steps. First, you select the command you want from one of Chart's three main command menus. Then you select the subcommands you want. Then you fill in the command fields.

The Three Main Command Menus

Chart has three command menus: the List, Entry, and Chart menus. These three menus allow you to access all of Chart's commands.

The List menu contains commands for creating, gathering, and working with entire data series:

```
Analyze Chart Entry Format Gallery Help Include
Modify Name Options Print Quit Transfer Xternal
```

The Entry menu contains commands for entering and editing the contents of a data series:

```
Alpha Chart Format Gallery Help List Modify
Name Options Print Quit Sort Transfer Value
```

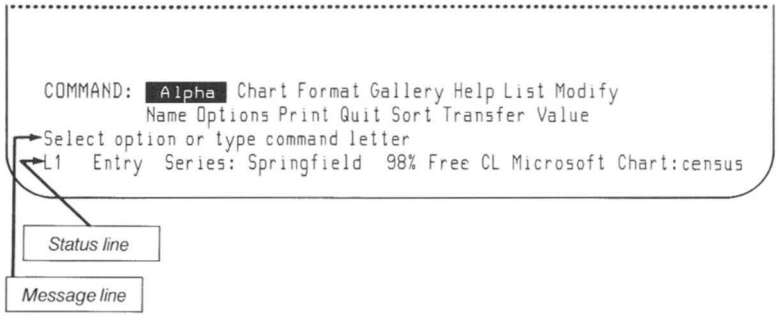
The Chart menu contains commands for making and revising charts:

```
Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
```

From each main command menu you can access the other two menus. For example, the Chart menu has an Entry command that displays the Entry menu, and the Entry menu has a Chart command that returns you to the Chart menu.

The Message and Status Lines

Below the command menu are the message and status lines:


COMMAND: Alpha Chart Format Gallery Help List Modify
Name Options Print Quit Sort Transfer Value
Select option or type command letter
L1 Entry Series: Springfield 98% Free CL Microsoft Chart:census
Status line
Message line

The message line is directly below the command menu. It tells you what to do next or what has gone wrong. For example, a common message is

```
Select option or type command letter
```

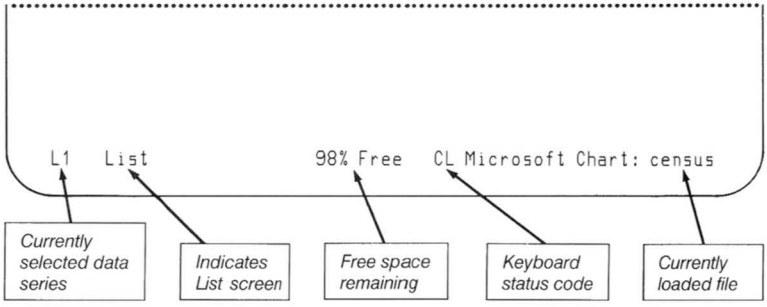
This indicates that Chart is waiting for you to choose your next command. Refer to Chapter 10, "Message Directory," for detailed explanations of the messages that appear on the message line.

The status line, located directly below the message line, displays information about the status of Chart. The status lines for the List, Entry, and Chart menus differ slightly. All three display the following:

- Percentage of free space remaining in the computer's memory

- Status of the keyboard
- Name of the currently loaded file

The status line on the List screen looks like this:


L1 List 98% Free CL Microsoft Chart: census
Currently selected data series
Indicates List screen
Free space remaining
Keyboard status code
Currently loaded file

It also displays:

1. The currently selected data series; "L1" means you have selected line 1, the first data series.

2. The word "List" indicating that you're currently viewing the List screen.

The status line on the Entry screen looks like this:

L1 Entry Series: Springfield 98% Free Microsoft Chart: census
Currently selected data point
Indicates Entry screen
Name of displayed data series

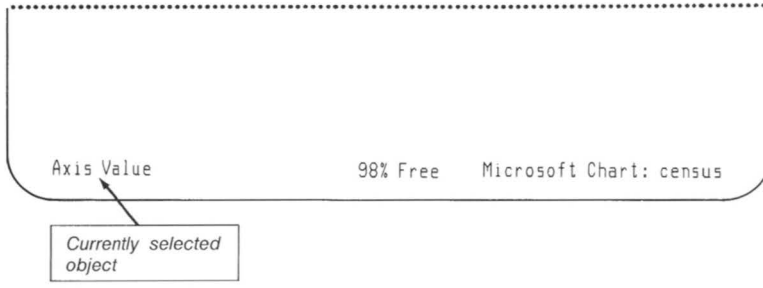
It also displays:

1. The currently selected data point; "L1" means that you have selected line 1, the first data point.

2. The word "Entry," indicating that you're currently viewing the Entry screen.

3. The name of the data series displayed on the Entry screen.

The status line on the Chart screen looks like this:



It also displays the object you have selected on the Chart screen. For example, if you have selected the value axis on the Chart screen (that is, if the selection arrow points to the value axis), the Chart status line will display "Axis Value."

If the percentage of remaining free space gets low, you can remove some data and formatting information to make more space:

- If you don't want to save the information you are removing, use the Transfer Clear command.

- If you want to save the information, use the Transfer Save command before you use the Transfer Clear command.

Keyboard status codes are:

CL	Caps lock
SL	Scroll lock
NL	Number lock

To lock any of the above keys, press the key once. To unlock, press the key again. Keyboard status codes are displayed only when one of the above keys is locked. Refer to "The Keyboard" for a description of the functions of these keys.

Choosing a Command

You can choose a command when any of the main command menus is on the screen and the message line reads:

```
Select option or type command letter
```

When this message appears, you can choose a command in either of two ways:

1. Press the first letter of the command you want (for example, press *C* to choose the Chart command).

   or

2. Press the spacebar or the BACKSPACE key until the command you want is highlighted on the menu. Then press the RETURN key.

   The spacebar moves the highlight to the next command; the BACKSPACE key moves it to the previous command.

Many of the commands on the List, Entry, and Chart menus have subcommands. When you choose such a command, Chart replaces the main command menu with a new menu, the subcommand menu. The subcommand menu will show the command you have already chosen in capital letters. For example,

when you choose the Transfer command, the following subcommand menu appears:

```
TRANSFER: Load Save Clear Delete Merge Options
```

Choose from the subcommand menu the same way you choose from the main menus.

Filling in Command Fields

When Chart needs more information before it can carry out a command or subcommand, it presents a menu of one or more command fields in which you fill in or choose a response.

There are two types of command fields:

1. "Fill-in" command fields, such as the "filename" field, require you to fill in a response.

2. "Menu" command fields, such as the "load" field, give you a menu of options to choose from.

```
TRANSFER LOAD filename: ■
                  load:(All)Data Format
```

The active command field, the one currently awaiting your entry, is highlighted. When a group of command fields first appears on your screen, the first field is active. When you move to an inactive command field, it becomes active and the field is highlighted.

To move from command field to command field, press the TAB key and the BACKTAB key. The TAB key moves the highlight to the next command field; the BACKTAB key moves the highlight to the previous command field.

When you have responded to the necessary command fields, press the RETURN key to carry out the command.

The message line tells you what kind of response is expected in each command field. Chapter 9, "Command Directory," explains the responses needed for every command field. Certain common principles apply:

1. Whenever the message line starts with "Enter...," you must fill in the command field. To fill in the command field, you may accept the proposed response or type in another.

2. If the message contains "...or use direction keys," you can press any direction key to display and enter a response from a list of possible responses. Or, you can type in the response yourself.

   The way in which the responses appear when you press direction keys depends on the particular command field:

   - For some command fields (for example, "filename" in the Transfer Load command), the first press of a direction key displays a list of all the available responses. You can use the direction keys again to choose from the list. Then press the TAB key to move to the next command field, or the RETURN key to carry out the command.

   - For other command fields (for example, most fields in the Format Pattern command), pressing a direction key displays one of the available responses in the field. Each time you press a direction key, the response changes. You can use the direction keys to step through all of the available responses.

3. When the message says "Select option," you are in a menu command field; you choose your response from a menu rather than typing it in. Choose the option you want by either of the two methods used for choosing commands:

   - Press the first letter of the option.

     or

   - Press the spacebar or the BACKSPACE key to make your choice, then press the TAB key to move to the next command field, or the RETURN key to carry out the command.

Note

If you enter an invalid response in a command field, you may not be able to go to the next command field until you enter a valid response. If the current response is invalid, the message in the message line will begin "Not a valid..." See Chapter 10, "Message Directory" for a list of all messages, the reasons they appear, and how to respond to each.

Proposed Responses

Chart proposes responses for commands, subcommands, and command fields. Proposed responses are usually based on the current status of your work or your last use of a command. In either case, Chart anticipates your next action to reduce the number of steps needed to carry out a command.

You can also use the proposed responses to check on the status of a chart or object in a chart. For example, you can see what the category axis and value axis labels would be for a data series by selecting the series and choosing the Name command, which you used to define the labels.

Proposed responses in the command menus, subcommand menus, and active command fields are highlighted. If a fill-in command field is inactive, the proposed response is the response already in the field. If a menu command field is inactive, the proposed response is in parentheses.

If you want to accept the proposed command, choose it by pressing the RETURN key. If you want to accept a proposed response in an active command field, press the TAB key to move to the next field. If the proposed responses in all command fields are acceptable, you can carry out the command by pressing the RETURN key.

Editing Responses in Command Fields

Fill-in Command Fields

When you tab to a fill-in command field, the entire proposed response is highlighted.

To replace the entire proposed response:

- Type the replacement. Chart automatically deletes the proposed response when you type the first character of the new one.

To delete the entire proposed response and leave the command field empty:

- Press the DELETE key. All highlighted text is deleted.

To highlight characters or words so you can change part of the proposed response:

- Use the CHARACTER LEFT and CHARACTER RIGHT keys to highlight characters. Use the WORD LEFT and WORD RIGHT keys to highlight words.

To insert new text into the proposed response:

- Type the text to insert it to the left of the highlight.

To delete part of the proposed response:

- Use the BACKSPACE key to delete the character to the left of the highlight.

  or

- Use the DELETE key to delete the highlighted text.

To delete part of the proposed response and replace it with new text:

- Use the DELETE key and type the new text.

Menu Command Fields

You can change the proposed response in a menu command field by choosing a new option.

Cancelling a Command

You can cancel a command and return to the main command menu any time before you press the RETURN key. To cancel a command, press the CANCEL key. You cannot cancel a command after you press the RETURN key.

You can press the CANCEL key while Chart is printing. This stops the printer, and the message line will ask you if you want to continue. If you press *N*, Chart returns you to the main command menu. If you press *Y*, Chart continues printing.

Getting Help with Commands

Help is available any time you need it. When any one of the three main command menus is on the screen, you can get general information by choosing the Help command.

After you have selected the Help command:

- Use the Auto-Set, Commands, Devices, and Keyboard subcommands to display information on those specific topics.
- Use the Next and Previous subcommands to display the next and previous screens of Help information.
- Use the Start subcommand if you want to go back to the first screen of the Help information.
- To continue your work with Chart press *R* for Resume.

To get help with a particular command:

1. Press the spacebar or the BACKSPACE key to highlight the command you want help with.

2. Press the HELP key. If you don't know which key is the HELP key, see "The Keyboard."

   Chart displays information on the highlighted command.

To get help with a particular command field:

1. Choose the command you want.

2. Press the TAB key to move to the field you want help with.

3. Press the HELP key.

   Chart displays information on that command field.

For additional information about the Help command, see Chapter 9, "Command Directory."

Chapter 5
Preparing Data for a Chart

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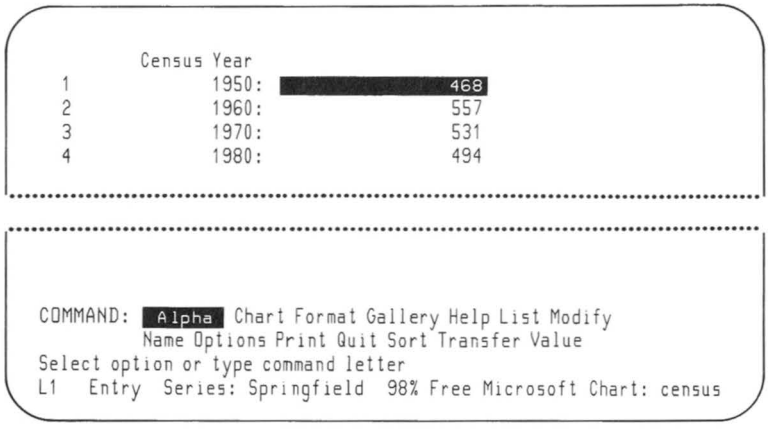
Creating a New Data Series

When you want to chart some data, the first thing you need to do is to create a place or "container" to hold the data. This container is called the data series.

A data series is a collection of data presented as a two-column table. The column on the left contains categories; the column on the right contains values corresponding to each of the categories. For example, the categories could be census years, the values could represent population. Each category-value pair is called a data point. In the data series below, the population in 1950 is one data point.


Census Year
1 1950: 468
2 1960: 557
3 1970: 531
4 1980: 494
COMMAND: Alpha Chart Format Gallery Help List Modify
Name Options Print Quit Sort Transfer Value
Select option or type command letter
L1 Entry Series: Springfield 98% Free Microsoft Chart: census

To create a data series:

1. If the List menu is not on the screen, choose the List command.

2. Create and select a new series by pressing the DOWN key until the highlight moves one line beneath the last series on the List.

   This line will contain only a line number followed by the highlight.

3. Choose the Name command.

```
NAME define series name: ■
     category name:                value name:
     category type:(Date)Number Sequence Text
     category start:                increment:
     increment period: Day Month Weekday(Year)
```

4. Type a name for the series in the "define series name" field.

5. Type a name for the categories in the "category name" field.

6. Type a name for the values in the "value name" field.

7. Choose a category type for the data series in the "category type" field.

   Choose *Date* or *Sequence* if you want your categories to be dates or a sequence of numbers with a constant increment between each number. As you enter values for your series on the Entry screen, Chart will automatically calculate and enter the dates or numbers in the category column. Then:

   - Type the first date or number in the "category start" field, and type an increment in the "increment" field.
   - If you chose *Date* in the "category type" field, choose a time period in the "increment period" field.

   Note

   To specify an increment of quarters in a Date series, enter *3* in the "increment" field and choose *Month* in the "increment period" field.

   Choose *Text* if you want your categories to be names, and *Number* if you want your categories to be a non-sequential list of numbers. For Text and Number series you enter both categories and values.

8. Press the RETURN key.

Now you can enter data into the data series. For details on how to enter data, see the next section and "Copying Data from Multiplan Worksheets" in this chapter. For more on the four category types, see the Name command in Chapter 9, "Command Directory."

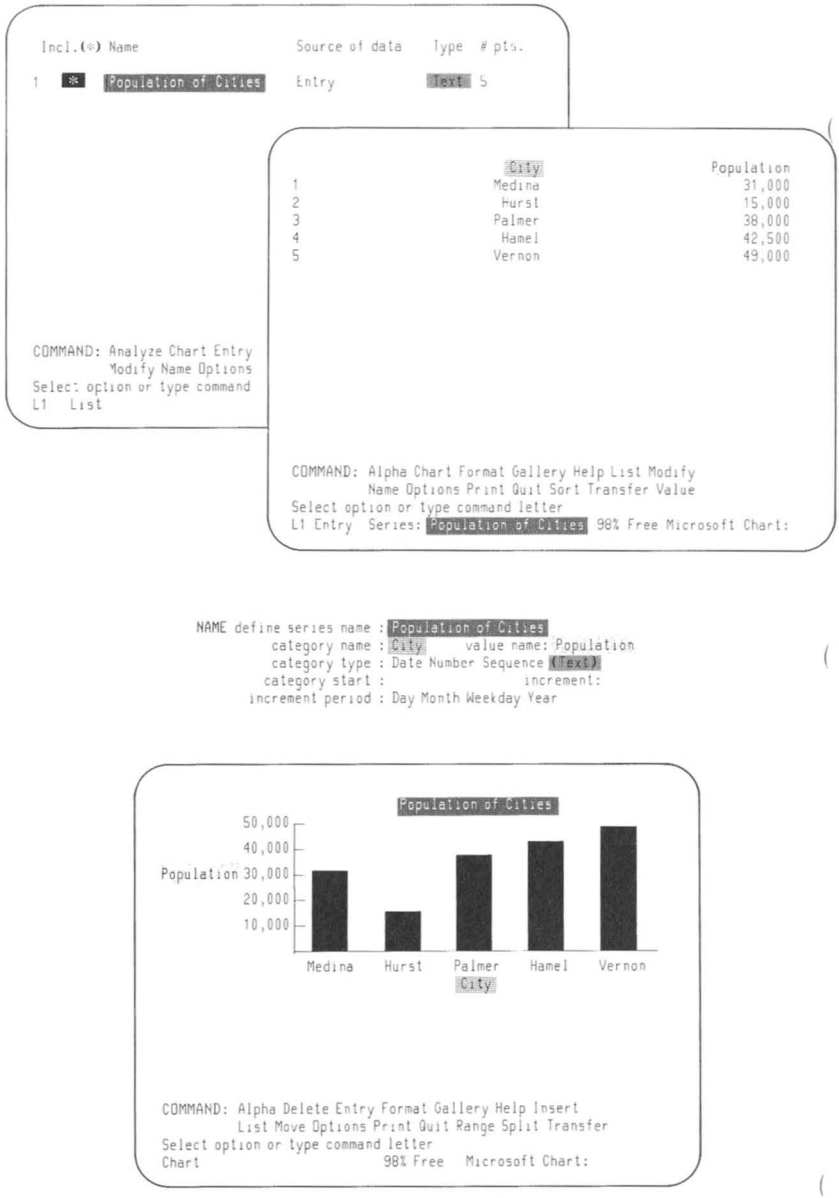


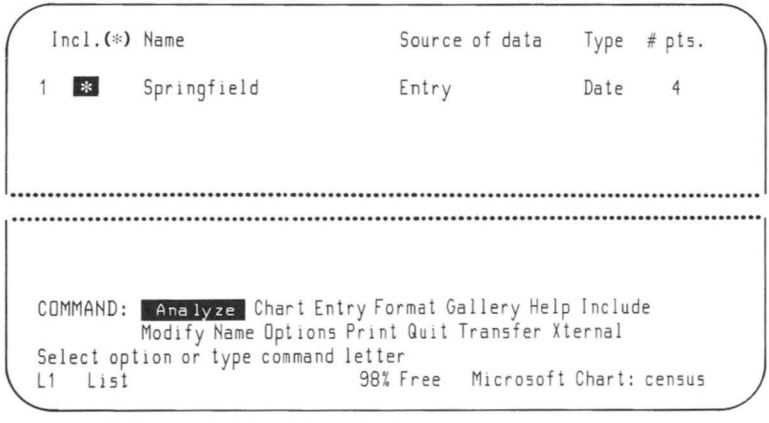
Figure 5.1. Creating a New Series With the Name Command

Entering Data From the Entry Screen

When you have created a data series on the List screen, you are ready to go to the Entry screen and enter the data for the series. First you must display the data series on the Entry screen.

To display a data series on the Entry screen:

1. If you are on the List screen, use the direction keys to select the series.



   Then choose the Entry command.

2. If you are on the Entry screen, use the NEXT SERIES and PREVIOUS SERIES keys to display the proper series.

   The data series and the Entry menu appear on the screen. For Number and Text series, where you enter both categories and values, the first category is highlighted. For Date and Sequence series, where Chart enters the categories and you enter just the values, the first category is already entered and the first value is highlighted.

To enter data into a Text or Number series:

1. To enter the first category of a text series, choose the Alpha command. This lets Chart know that what you type next is text and not a command. If you want to enter a number you can proceed directly to step 2.

2. Type the text or number for the first category.

   You can edit what you have typed just as you would edit the response in any fill-in command field. See "Editing Responses in Command Fields" in Chapter 4 for details.

3. Press the RIGHT direction key.

4. Type the number for the first value, and press the RIGHT direction key.

5. Repeat steps 2 through 5 until you have typed in the last value.

6. Press the RETURN key to enter the last number and carry out the Alpha command.

To enter data into a Date or Sequence series:

1. Type in the first value.

2. Press the DOWN direction key.

   Chart automatically enters the category for the next data point.

```
        Census Year   Population(Thousand
1             1950:                  468
2             1960:
```

```
ALPHA/VALUE:

Enter value
L2   Entry  Series: Springfield  98% Free Microsoft Chart: census
```

3. Repeat steps 1 and 2 until you have typed in the last value.

4. Press the RETURN key to enter the last number and carry out the Alpha command.

```
        Census Year   Population(Thousand
1             1950:                  468
2             1960:                  557
3             1970:                  531
4             1980:                  494
```

```
COMMAND: Alpha Chart Format Gallery Help List Modify
         Name Options Print Quit Sort Transfer Value
Select option or type command letter
L1   Entry  Series: Springfield  98% Free Microsoft Chart: census
```

To change the format of the categories or values, or to change the data itself, see "Changing a Data Series" in this chapter.

More About Numbers and Text

To enter text in the category column, choose the Alpha command to let Chart know that what you type next is not a command. Because no commands begin with numbers, you do not need to choose the Alpha command to enter numbers—you can just type them in. The Alpha command is identical to the Alpha command in Microsoft Multiplan.

You can type numbers in any of the following ways:

- As integers (like 123 or -7)
- As decimal fractions (like 123.45 or 0.9876)
- In scientific notation (like 1E-5 or -1.5E6)

You control the way numbers appear—for example, as dollars or percentages—with the Format Category and Format Value commands from the List and Entry menus. Therefore, do not use dollar signs, commas, or other non-numeric characters when you enter numbers. For more information, see "Formatting Numbers" under "Changing a Data Series" in this chapter.

Scientific Notation

Scientific notation is a shorthand method of representing very large or very small numbers. In scientific notation, a number has three parts:

- Mantissa (an integer or decimal)
- Exponent (E)
- Integer (a positive or negative integer)

The number is read "*(mantissa)* times ten to the *(integer)* power." For example:

$$12.1E2 = 12.1 \times 10^{2} = 1{,}210$$

$$1E\text{-}5 = 1 \times 10^{-5} = 0.00001$$

$$-1.5E6 = -1.5 \times 10^{6} = -1{,}500{,}000$$

The largest positive number you can enter into a data series is 9.9999999999999E60; the smallest is 1E-62. Numbers can have up to 14 significant digits.

Changing a Data Series

You can change a data series by:

- Editing data points
- Formatting data points
- Inserting data points into a series
- Deleting data points from a series
- Rearranging data points within a series

Editing Data Points

To edit data points in the series displayed on the Entry screen, use the Alpha command. In Number and Text series, you can select and change each category and value individually. In Date and Sequence series, Chart calculates the categories for you based on your responses in the "category start," "increment," and "increment period" fields of the Name command. In Date and Sequence series, you cannot edit categories; you can edit values only. This is indicated by a broken vertical line at the right of the categories.

To edit a data point on the Entry screen:

1. Use the direction keys to select the category or value you want to change.

2. Choose the Alpha command.

   The contents of the category or value appear in the command area.

3. Edit the category or value just as you would edit the response in any fill-in field. See "Editing Responses in Command Fields" in Chapter 4 for details.

4. Press the RETURN key.

   The edited contents replace the previous contents of the selected category or value.

Formatting Data Points

You can change the appearance of data points by:

- Formatting numbers
- Formatting dates
- Aligning text and numbers
- Changing the number of characters displayed

Formatting Numbers

To control how numbers appear—for example, as dollars or percentages—use the Format Category and Format Value commands. Once formatted, numbers will appear on the chart the way they appear on the Entry screen.

The following applies to categories in Number and Sequence series and to values in all types of series.

To format numbers:

1. If you are on the List screen, use the direction keys to select the data series you want to format. If you are on the Entry screen, use the NEXT SERIES and PREVIOUS SERIES keys to display the data series you want to format.

2. Choose the Format Category command to change categories or the Format Value command to change values.

3. Choose the format you want in the "number format" field.

4. Type the number of decimal places you want to show in the "# of decimals" field.

5. Press the RETURN key.

Examples of the different formats are shown in Table 5.1.

Table 5.1

Display of Numbers in Different Formats

	Number Typed			
Format	**1**	**.7**	**12.345**	**25**
Scientific notation	1.00E+00	7.00E−01	1.23E+01	2.50E+01
Fixed point	1.00	0.70	12.35	25.00
General	1	.07	12.345	25
Integer	1	1	12	25
Dollar	$1.00	$0.70	$12.35	$25.00
Percent	100.00%	70.00%	1234.50%	2500.00%

With the General format, Chart displays numbers with the number of characters you specify in the Format Category and Format Value commands. When a number would otherwise exceed the maximum number of characters, Chart automatically displays the number in scientific notation.

Frequently, you will want the values on the chart to be displayed in units other than those of the original data. For example, if you have a series of populations, you may want to display a population of 268340 as "268 thousand." To do so, first append *Thousands* or *1,000's* to the value name specified in the Name command, to indicate that the number you enter represents the population in thousands. Then you can either:

1. Enter *268.340* as the value on the Entry screen.

   or

2. Enter *268340* as the value on the Entry screen, and enter *1000* in the "scale" field of the Format Value command. This displays the number as 268.340 though its actual value is unchanged.

You can use the same procedure to change the categories of Number and Sequence series. You can enter any scale factor or append any notation to a category or value name that suits your needs.

Formatting Dates

In Chart, a date has five parts: day, month, year, quarter, and day of the week. Each of these parts has a short, medium, and long form, as shown below. With the Format Category command, you control which form is used and which parts of the date show. Dates appear on the Chart screen the same way they appear on the Entry screen.

Format:	Shows as:
Short	1/18/50/ Q1 W
Medium	Jan 18, 1950 Quarter 1 Wed
Long	January 18, 1950 First Quarter Wednesday

To change the date format:

1. If you are on the List screen, use the direction keys to select the data series you want to format. If you are on the Entry screen, use the NEXT SERIES and PREVIOUS SERIES keys to display the data series you want to format.

2. Choose the Format Category command.

3. Choose *Short*, *Medium*, or *Long* in the "date format" field.

4. In the five fields that start with "show," choose *Yes* for each part of the date you want to appear; choose *No* for each part you don't want to appear.

5. Press the RETURN key.

Aligning Text and Numbers

You can align categories and values to the left, right, or center with the Format Category and Format Value commands. The alignment affects how the data appears on the Entry screen as well as in tick mark labels on the chart. (Tick mark labels identify the categories and values at regular intervals along the axes.)

To change the alignment of data:

1. If you are on the List screen, use the direction keys to select the data series you want to format. If you are on the Entry screen, use the NEXT SERIES and PREVIOUS SERIES keys to display the data series you want to format.

2. Choose Format Category to change categories or Format Value to change values.

3. Choose *Center*, *Left*, or *Right* in the "align" field.

4. Press the RETURN key.

Changing the Number of Characters Displayed

The category and value columns on the Entry screen are 20 characters wide. This is the maximum number of characters that can be displayed on the Entry screen. However, text, dates, or numbers up to 254 characters long may be entered with the Alpha command on the Entry screen and displayed on the Chart screen.

To limit the number of characters displayed in either the category or the value column, change the response in the "# of characters" fields of the Format Category and Format Value commands, as described below. This limits the displayed length of the categories and values on the Entry screen, and in labels on the chart.

For text and dates longer than the limit in the "# of characters" field of the Format Category command, the first part of the text or date shows. For numbers longer than the limit, including categories in Sequence and Number series as well as all values, you will see a row of number signs (##########) instead of the number. This is to prevent mistaking a partial number for a complete one.

To change the number of characters displayed:

1. If you are on the List screen, use the direction keys to select the data series you want to format. If you are on the Entry screen, use the NEXT SERIES and PREVIOUS SERIES keys to display the data series you want to format.

2. Choose the Format Category command to change categories or the Format Value command to change values.

3. Type the number of characters you want showing in the "# of characters" field.

4. Press the RETURN key.

Inserting Data Points

To insert new data points into a series, go to the Entry screen and use the Modify Insert command.

When you insert data points in Date and Sequence series, all values below the inserted data points move down. Chart calculates new categories for all data points from the first inserted data point to the end of the series.

When you insert data points in Number and Text series, both the values and the categories of the data points below the inserted data points move down.

To insert data points into a series on the Entry screen:

1. Use the direction keys to select either the category or value immediately below where you want to insert the new data points.

2. Choose the Modify Insert command.

3. Type the number of data points you want to insert in the "# of points" field.

4. Press the RETURN key.

Chart recalculates the categories for Date or Sequence series. For Number series, new categories will be zero; for Text series, new categories will be blank. You can select and edit them with the Alpha command. For all series, new values will be zero until you change them with the Alpha command.

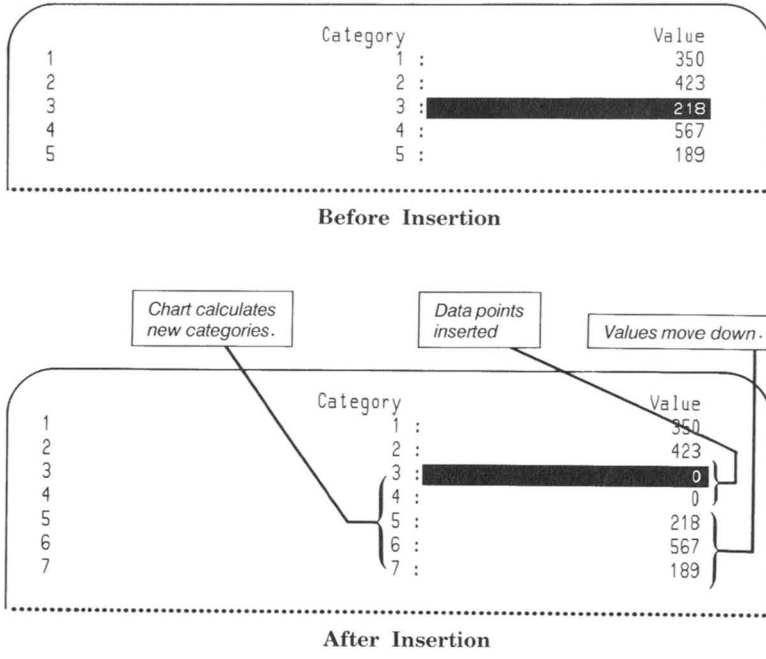


Figure 5.2. Inserting Data Points in a Sequence Series

Deleting Data Points

To delete data points from a series, go to the Entry screen and use the Modify Delete command.

When you delete data points in Date and Sequence series, all values below the deleted data points move up. Chart calculates new categories for all moved data points.

When you delete data points in Number and Text series, both the values and the categories of the data points below the deleted data points move up.

To delete data points from the series on the Entry screen:

1. Use the direction keys to select either the category or value of the first data point you want to delete.

2. Choose the Modify Delete command.

3. Type the number of data points you want to delete in the "# of points" field.

4. Press the RETURN key.

   Chart deletes the number of data points you specify, beginning with the one you selected. Chart recalculates the categories for Date or Sequence series. For Number and Text series, both categories and values are deleted.

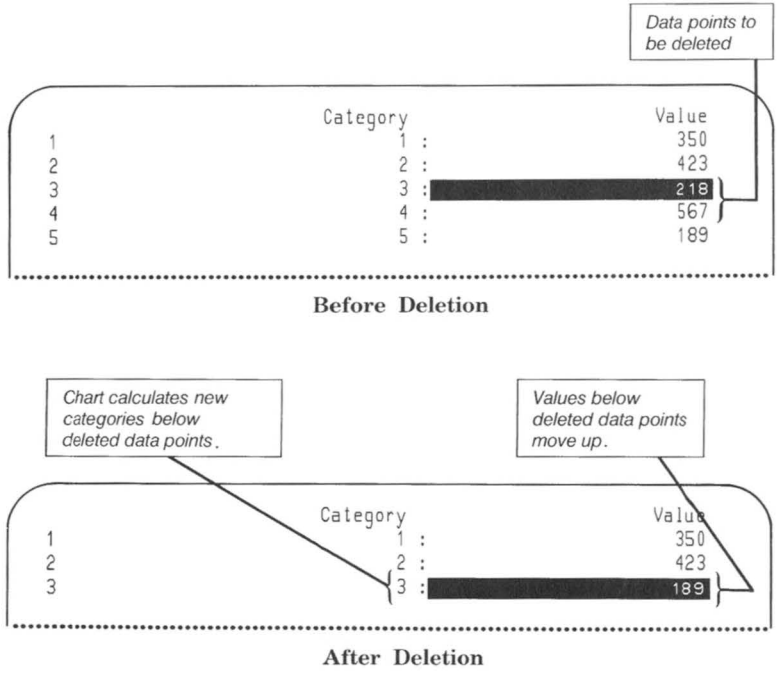


Figure 5.3. Deleting Data Points from a Sequence Series

Rearranging Data Points

You can change the arrangement of data points by:

- Moving them
- Sorting them into either ascending or descending order
- Combining two or more data points into a single data point

Moving Data Points

At some point you may want to move data points on the chart. To move data points, go to the Entry screen and use the Modify Move command.

When you move data points in Date and Sequence series, only the values are actually moved. To maintain the order of the series, Chart calculates new categories for all data points.

When you move data points in Number and Text series, entire data points are moved.

To move data points in the series on the Entry screen:

1. Use the direction keys to select either the category or value of the data point you want to move. If you want to move a group of data points, select the first data point in the group.

2. Choose the Modify Move command.

3. In the "before line" field, type the number of the line before which you want to move the selected data point or points.

   For example, if you want to move the data point on line 5 to the spot between line 2 and line 3, type *3*.

Note

If you want to reposition a data point as the last item on the Entry screen, type a number that is higher than the line number of the last data point on the screen.

---

4. Type the number of data points you want to move in the "# of points" field.

5. Press the RETURN key.

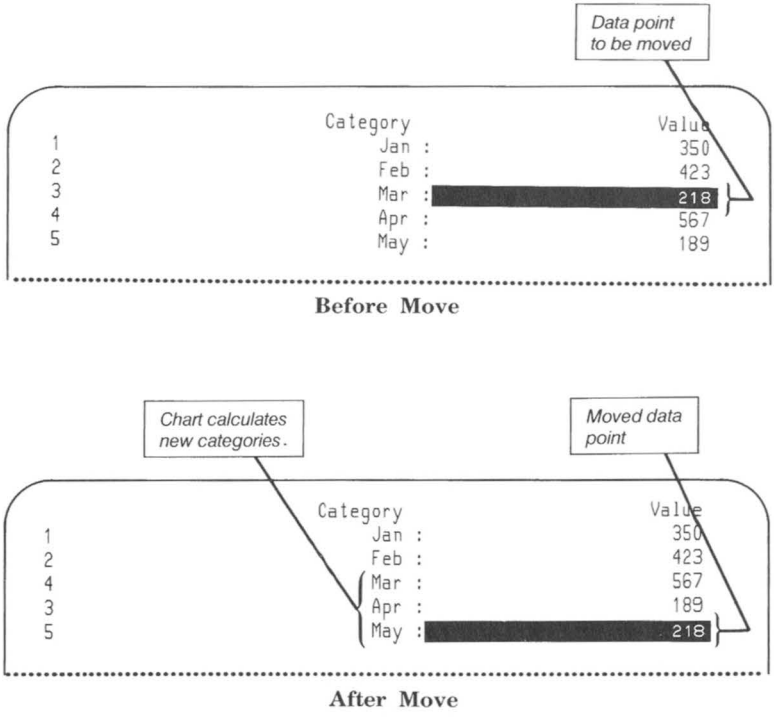


Figure 5.4. Moving Data Points

Sorting Data Points

To sort data points, go to the Entry screen and use the Sort command. You can sort either by categories or by values. The categories of Date and Sequence series are, by nature, already sorted.

When you sort data points in Date and Sequence series, only the values are actually moved. To maintain the order of the series, Chart calculates new categories for all data points.

When you sort data points in Number and Text series, entire data points are moved.

To sort the data series on the Entry screen:

1. Choose the Sort command.

2. To sort by categories, choose *Category* in the "by" field; to sort by values, choose *Value*.

3. To sort in ascending order, choose ">" in the "order" field; to sort in descending order, choose "<."

4. Press the RETURN key.

For more information on sorting, see the Sort command in Chapter 9, "Command Directory."

Combining Data Points

To combine data points, go to the Entry screen and use the Modify Combine command. This is especially useful when you want to combine two or more wedges of a pie chart.

When you combine data points in Date or Sequence series, Chart calculates new categories for all data points from the combined data point to the end of the series.

When you combine data points in a Text series, the category of the new data point is blank. You can rename the blank category with the Alpha command, just as you would enter or edit any category in a Text series.

When you combine points in a Number series, the category of the new data point is the sum of the categories of the combined data points.

To combine two or more data points:

1. Use the direction keys to select the first of the data points you want to combine.

2. Choose the Modify Combine command.

3. Type the number of consecutive data points you want to combine in the "# of points" command field.

4. Press the RETURN key.

   A single new data point replaces the specified data points. The value of the new data point is the sum of the values of the specified data points.

Loading and Merging Data From Chart Files

The Transfer Save command saves your file on a disk. After you save a file, you can use the Transfer Load and Transfer Merge commands to retrieve just the data series, just the chart format, or both. You can use the Transfer Load or Transfer Merge command from the List, Entry, or Chart screen.

The Transfer Load command field looks like this:

```
TRANSFER LOAD filename: ■
                        load:(All)Data Format
```

If you choose *All* in the "load" field of the Transfer Load command, Chart loads the new data series and chart format, and replaces the current data series and chart format. With *Data* selected, the Transfer Load command loads the new data series and replaces the current data series, but leaves the current chart format unaffected. In both cases, the new data series are marked for inclusion (*) or exclusion (-) the same way they were marked when previously saved.

If you choose *Format* in the "load" field, the Transfer Load command loads the new chart format, replacing the current chart format, but leaving the current data series unaffected. See "Saving and Reusing Chart Formats" in Chapter 6 for details.

The Transfer Merge command field looks like this:

```
TRANSFER MERGE filename: ■
                         merge:(All)Data
```

If you choose *All* in the "merge" field of the Transfer Merge command, Chart loads the new chart format, replacing the current chart format, and adds the new data series to the data series already in the List.

If you choose *Data*, the Transfer Merge command adds the new data series to the current data series in the List but leaves the current chart format unaffected. In either case, the new data series are marked for inclusion (*) or exclusion (-) the same way they were marked when previously saved, and the old data series are marked for exclusion (-).

To load or merge data from a Chart file:

1. Choose the Transfer Load or Transfer Merge command, depending on whether you want to load or merge the data.

2. Use the direction keys to display and choose from a list of files, or type in the name of the file you want to load or merge.

3. Choose *All* or *Data* in the "load" or "merge" field, depending on whether you want the new data and the new chart format (*All*), or just the new data (*Data*).

4. Press the RETURN key.

The List screen before the Transfer Merge command:

```
 Incl.(*) Name                    Source of data    Type   # pts.

1   *     Northeast               Entry             Text      5
2   *     Southeast               Entry             Text      5
```

```
COMMAND: Analyze Chart Entry Format Gallery Help Include
         Modify Name Options Print Quit Transfer Xternal
Select option or type command letter
L1   List                        98% Free   Microsoft Chart: eastern
```

The Transfer Merge command field:

```
TRANSFER MERGE filename: western
               merge:(All)Data
```

The List screen after the Transfer Merge command:

```
 Incl.(*) Name                    Source of data    Type   # pts.

1   *     Northwest               Entry             Text      5
2   *     Midwest                 Entry             Text      5
3   *     Southwest               Entry             Text      5
4   -     Northeast               Entry             Text      5
5   -     Southeast               Entry             Text      5
```

```
COMMAND: Analyze Chart Entry Format Gallery Help Include
         Modify Name Options Print Quit Transfer Xternal
Select option or type command letter
L1   List                        98% Free   Microsoft Chart: western
```

For more information on loading, merging, and saving files with the Transfer commands, see "Operating Information" and the Transfer subcommands in Chapter 9, "Command Directory."

Copying Data From Other Application Programs

Using Chart's External command, you can create a new Chart file by copying data from Multiplan, Lotus 1-2-3 (.wks files), Lotus Symphony (.wrk files), dBASE II, and dBASE III. You can also copy any file stored in SYLK or DIF format, as well as columnar and delimited text files.

You can link the new Chart file you create to its source if you plan to update or revise data in the source file between charting sessions (for example, if you need to revise a forecast). Once the two files are linked, you need only revise the source file. Revised data is then automatically copied to the Chart file whenever you load it with the Transfer Load or Transfer Merge command.

If the Chart file is not linked to its source, you can edit both categories and values in the Chart file, and change the series type with the Name command. However, if the Chart and source files are linked, you can edit the data in the source file only. You can use the Format Category or Format Value command to change the appearance of the copied data on a chart. You cannot, however, use the Alpha command to change the actual data (categories and values).

Copying Data From an External Source

The following example illustrates the basic procedure for copying data to a Chart file from another application program.

From the portion of the Multiplan worksheet PROFITS.PLN, shown below, you want to make a chart comparing costs and revenues for January through March:

	1	2	3	4	5
#1					
1		Jan	Feb	Mar	Total
2	Costs	$16150	$15820	$17970	$49940
3	Revenue	$24680	$27540	$29760	$81980

To copy the data from Multiplan to Chart:

1. Start Chart.

2. Use the Transfer Options command to specify the disk drive or the pathname to the directory containing PROFITS.PLN. For example, type *b:* in the "setup" field.

3. Choose the Xternal command from the List menu.

4. Choose the Multiplan subcommand.

5. In the "filename" field, type *profits.pln*

6. In the "linked" field, choose *Yes* to link your Chart file to PROFITS.PLN. Choose *No* to make a one-time permanent copy of the data you want from PROFITS.PLN.

7. In the "named area or reference" field, type *R2C2:R3C4*

   Any data copied from a source file must form a rectangular area within the file. R2C2 identifies the row and column location of the cell in the upper left corner of the rectangular area you want to copy; R3C4 identifies the location of the cell in the lower right corner. The combined reference to these two diagonally opposed cells defines the entire rectangular area that falls between them.

Note

If you previously used Multiplan's Name command to name the area defined by R2C2:R3C4, you can type the name instead of the absolute reference.

---

8. In the "orient series by" field, choose either *Row* or *Column*. Steps 9 and 10 below assume that you choose *Row*.

9. In the "series name(s) from" field, type *1* to name the data series copied from PROFITS.PLN "Costs" and "Revenue."

10. In the "categories from" field, type *1* to label the categories of the copied series "Jan," "Feb," and "Mar."

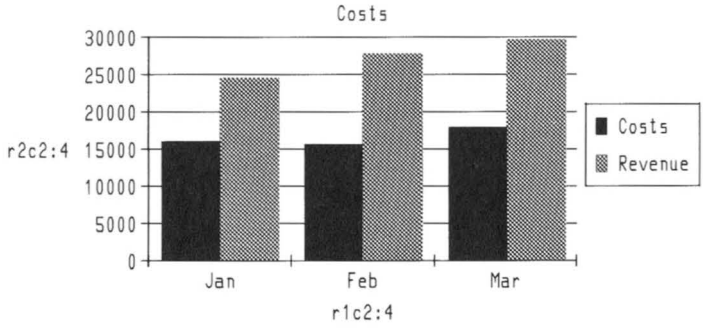
11. Accept the proposed response of *Text* in the "category type" field.

12. Press the RETURN key.

Once you've carried out the External command, you can chart the copied data. As usual, Chart will draw a column chart for you unless you specify a different chart type. Each cell you've copied from the worksheet will appear as one data point on the chart.

Series Oriented by Row

Because you chose to orient data series by row, your chart will look like this:



The chart contains two data series. Each series contains three data points.

Note

If you chose to orient data series by columns, your chart will show three data series containing two data points each. For details on the difference between row and column orientation, see the discussion of the External command in Part 3 of this manual.

Notice that Chart used the name of the first series it created from the copied data as the title for the chart. Chart used the reference to the row containing the first series as the value axis label, and the reference to the row you identified in the "categories from" field as the category axis label. Of course, you can change the title, value, and category axis labels by selecting and editing them.

The content of category labels is keyed to your response in the "orient series by" field. Because you oriented the series by rows, and entered 1 in the "categories from" field of the External command, Chart used the text from row 1 of the worksheet as category labels. Based on your response of *1* in the "series name(s) from" field, Chart used the text in column 1 of the worksheet as series labels in the legend. Based on your response of *Text* in the "category type" field, Chart considers the new series as Text series.

Note

For instructions on how to create sequence and number series from copied data, see the discussion of the External command in Part 3 of this manual.

On the List screen, Chart will show the two data series you've copied as Text series. If you linked the series to PROFITS.PLN, Chart will show the reference to the area of the worksheet each series is linked to in the "Source of data" column.

Copying Data From Lotus 1-2-3 and Lotus Symphony

You use the Lotus subcommand from the External menu to copy data from Lotus 1-2-3 or Lotus Symphony to a new Chart file. Doing so allows you to transform the type of analytical chart ("graph") produced by Lotus into the type of presentation-quality chart you can produce with Chart. For example, once you've copied the Lotus graph to Chart, you can position free labels anywhere on the chart or take advantage of Chart's more extensive color selection.

The procedure for copying data from a Lotus file is identical to that for copying data from a Multiplan file (discussed above), with the following exceptions:

- The Lotus subcommand has an additional field, called "type." In this field, you specify whether you want to copy data directly from a Lotus worksheet or from a graph of the data that you previously stored with the worksheet.

- Cell references differ between Lotus worksheets and Multiplan worksheets, thereby affecting the responses you enter in the "named area or reference," "series name(s) from," and "categories from" fields.

Choose *Worksheet* in the "type" field if you want to copy data directly from the Lotus worksheet. As usual, Chart will use your responses in the "orient series by," "series name(s) from," and "categories from" fields to divide the copied data into series and structure the chart you make of the data.

Choose *Graph* in the "type" field if you want to copy a graph that you've stored with the worksheet. In this case, the number of data series and basic structure of the chart are already defined in your Lotus graph. Chart will therefore ignore the current response in the "orient series by" field. Leave the "series name(s) from" and "categories from" fields blank whenever you choose *Graph* in the "type" field.

Note

If you want to copy the current graph, you can leave the "named area or reference" field blank. However, if you want to copy a graph other than the current one, you must enter the name of the graph.

Saving the New Chart File

When you've finished making your chart of the data you copied from an external source, use the Transfer Save command to save your new Chart file.

Hint

If you've linked your new Chart file to its source, you might want to store both files on the same data disk or in the same directory. Doing so will simplify the procedure the next time you want to load the new Chart file.

Make sure to save your Chart file under a name that distinguishes it from its source file. Doing so is especially important if you've linked the two files. You can save the Chart file under a different name by changing either the name or the extension of the source file (for example, you might save a Chart file as PROFITS.CHT to distinguish it from a Multiplan source file named PROFITS.PLN).

If you've linked the Chart file to its source, Chart saves only the chart format stored in the new file. If you haven't linked the two files, Chart saves both the data and format stored in the new Chart file.

Reloading the Chart File

The procedure for loading your Chart file the next time you want to work with it varies slightly depending upon whether or not you stored the Chart file on the same disk, or in the same directory, as its source file. In either case, you load the Chart file with either the Transfer Load or Transfer Merge command.

Any unlinked Chart file you load contains the data you originally copied from its source file, and the chart format you previously applied to the copied data. Because the file is not linked to its source, you can change both the chart format and the data contained in the file.

If the Chart file is linked to its source, and you did not store both files on the same disk or in the same directory as the source file, Chart will display the following message when you press the RETURN key:

```
Enter Y to retry access to (name of source file)
```

This message tells you that the source file is in a different location from the one currently specified in the "setup" field of the Transfer Options command.

To load the updated data from the source file, either replace the disk containing the Chart file with the disk containing the source file, then type *Y*, or:

1. Press the CANCEL key or press *N* for No.

2. Use the Transfer Options command to specify the pathname to the directory containing the source file.

3. Use the Transfer Load or Transfer Merge command to reload the Chart file.

You can now change the current chart format. You cannot, however, edit the data contained in the file.

Creating New Data Series From Old Series

To avoid reentering data which applies to several data series, you can create new series using existing series in the List by:

- Copying an entire data series and editing it
- Appending one data series to another
- Calculating a new series from an existing one

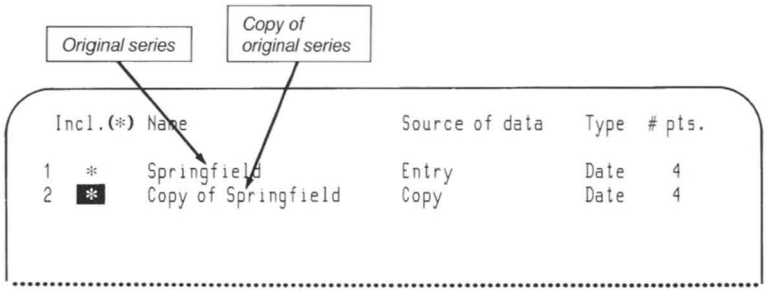
Copying a Data Series

To copy a data series:

1. On the List screen, select the data series you want to copy.
2. Choose the Modify Copy command.
3. Press the RETURN key.

   A new series will be inserted and selected in the List, below the original series.

The name of the new series is the name of the original series preceded by the words "Copy of." The type of series, category and value formats, and the data itself are identical. Change the name of the new series with the Name command (see Chapter 9 "Command Directory") and edit the data in the new series (see "Changing a Data Series" in this chapter).



Appending One Series to Another

To append one data series (the appended series) to another (the base series), go to the List screen and use the Modify Append command. Both series must be the same type (Data, Sequence, Number, or Text). The appended data series remains intact as a separate series. The base series contains its original data points plus a copy of the appended series.

To append one data series to another on the List screen:

1. Use the direction keys to select the series to be appended.

2. Choose the Modify Append command.

3. In the "to series in line" field, use the direction keys to point to the series to which you want to append the data.

4. Press the RETURN key.

The first data point of the appended series immediately follows the last data point of the base series. In Data and Sequence series, only values are appended. New categories for these values are automatically calculated. In Number and Text series, both categories and values are appended.

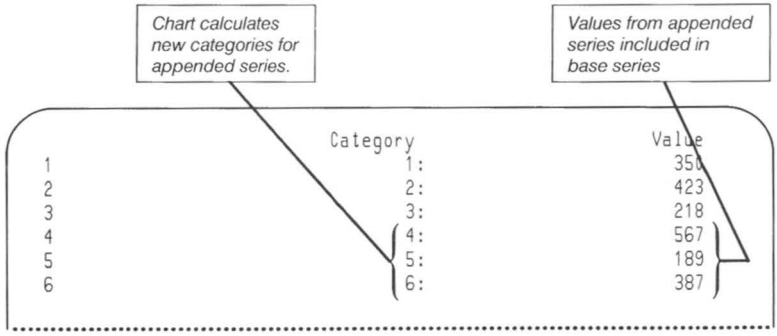
The base series before the Modify Append command (Sequence series):

	Category	Value
1	1:	350
2	2:	423
3	3:	218

The appended series before the Modify Append command:

	Category	Value
1	1:	567
2	2:	189
3	3:	387

The base series after the Modify Append command:



Calculating a New Series

The Analyze command provides eight built-in formulas for calculating a new data series from an existing series:

1. Average
2. Cumulative
3. Difference
4. Growth
5. Math
6. Percent
7. Statistics
8. Trend

For details on the formulas, see the Analyze commands in Chapter 9, "Command Directory."

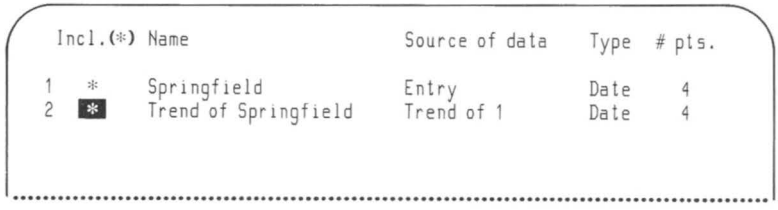
Because the values of the new series depend on the values in the original series, the new series is protected from editing. This means that whenever you change data in the original series, Chart recalculates the values of the new series. If you want to edit the calculated values, make a copy of the series (see "Copying a Data Series" in this chapter); the copy will not be protected.

To calculate a new series from an existing one:

1. On the List screen, select an existing series.
2. Choose the Analyze command.
3. Choose a subcommand.
4. Press the RETURN key.

The name of the new series tells you which subcommand was used to calculate it. In the example below, the series "Trend of Springfield" was created when the Analyze Trend subcommand was given for the Springfield series. The "Source of data"

column shows the name of the formula that was used to compute the series plus the line number of the original series; for example, "Trend of 1" was calculated from the series in line 1.



	Incl.(*)	Name	Source of data	Type	# pts.
1	*	Springfield	Entry	Date	4
2	*	Trend of Springfield	Trend of 1	Date	4

Moving Data Series

When a chart includes more than one data series, the data series are added to the chart in the order that they appear in the List. At some point, you may want to change the order in which series are displayed on a chart.

For example, you may want to reverse the positions of columns representing two data series. To do so, change the order of the data series on the List:

1. On the List screen, select the data series you want to move. If you want to move a group of data series, select the first series in the group.

2. Choose the Modify Move command.

3. In the "to before line" field, type the number of the line before which you want to move the series.

   If you want to reposition a data series as the last item on the List, type a number that is higher than the line number of the last data series. For example, if there are five data series in the List, type *6*.

4. In the "# of series" field, type how many consecutive series you want to move.

5. Press the RETURN key.

You can also control the order in which series are added to the chart by changing the response in the "series" field of the Format Type command. The order in which series are given in this field overrides the order of the List. This is especially useful when you have more than one chart and want to control the distribution and order of series in each chart individually. For details see "Data Series Distribution" in Chapter 7.

Deleting Data Series

To delete a data series from the List, use the Modify Delete command. This erases the data from Chart's working memory, making more workspace available. When you have saved a data series in a file on a disk, you can recover it by loading the file with the Transfer Load command. If you never saved the data series, it cannot be recovered.

To delete a data series:

1. On the List screen, select the data series you want to delete.

2. Choose the Modify Delete command.

3. In the "# of series" field, type how many consecutive series you want to delete.

4. Press the RETURN key.

   Because data may be lost, you are asked to confirm the command.

Including and Excluding Data Series From a Chart

You can put into a chart any or all of the series in the List. To be included in a chart, a series must be marked with an asterisk (*) in the "Incl." column in the List. When you create a series, Chart assumes you want to include it and marks it with an asterisk. If you type a hyphen (-) in the "Incl." column, the series is excluded. It will not appear in the chart.

To include a data series:

1. If the List is not on the screen, choose the List command.

2. Use the direction keys to select the series you want to include.

3. Type an asterisk (*).

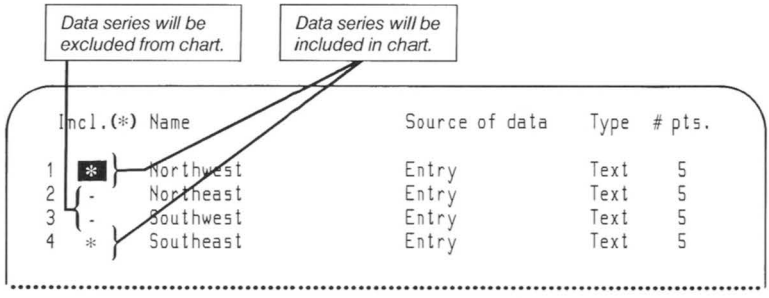
   The hyphen in the "Incl." column changes to an asterisk.

To exclude a data series:

1. Use the direction keys to select the series you want to exclude.

2. Type a hyphen (-).

   The asterisk in the "Incl." column changes to a hyphen.


Data series will be excluded from chart.
Data series will be included in chart.
Incl.(*) Name
Source of data
Type
pts.
1 * Northwest Entry Text 5
2 - Northeast Entry Text 5
3 - Southwest Entry Text 5
4 * Southeast Entry Text 5

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Making and Revising Charts

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After you have created one or more data series in the List, you can make a chart.

Chapter 5, "Preparing Data for a Chart," described how to enter and format data from the List and Entry menus. This chapter describes how to format the appearance of your chart by choosing commands from the Chart menu.

The Gallery

When you have created one or more data series and marked those series you want included in a chart (see "Including and Excluding Data Series from a Chart" in Chapter 5), you are ready to make the chart.

The Gallery displays eight basic chart types you can choose from. Each basic chart type has its own gallery showing several variations of that type.

Note

There is only one hi-lo chart; therefore, this chart type has no separate gallery. A hi-lo chart is only appropriate if you are charting more than one data series.

When you choose a chart type with the Gallery command, Chart draws a chart, determining the format—details of size, spacing, shading, color, and scale. The chart will have a title taken from the name of the first included series in the List. Axis labels will be taken from the category and value names of the first included series in the List. If needed, the chart will have a legend showing which pattern or color represents which data series.

To choose a chart type:

1. Choose the Gallery command.

2. Choose the type of chart you want.

3. Choose the number of the variation you want.

Use the Gallery command to choose or change the chart type. After you have chosen a chart type, you can go back and forth between the List, Entry, and Chart screens to gather more data, and edit and format data without entering the Gallery. Each time you choose the Chart command from the List or Entry menu, you will get the same kind of chart you chose last.

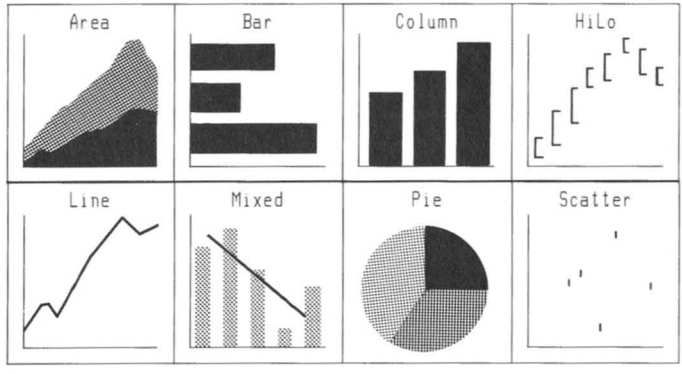


Figure 6.1. The Gallery

You can also change the chart type with the Format Type command (chart selected). See Chapter 9, "Command Directory," for details. For more information on the chart types, see the Gallery command in Chapter 9.

The chart type you choose from the Gallery is applied to the included data series to produce one or more charts.

The overall appearance of a chart is its format. The appearance of any particular detail in a chart depends on your choice in the Gallery, or your responses in the command fields. For example, you can specify color, pattern, frame thickness, or size for parts of a chart.

You can specify over one hundred different format elements to create many distinct charts. When you choose a chart type from the Gallery, Chart specifies most format elements for you. Each chart type in the Gallery is a predefined set of format elements designed to produce an effective chart.

Experiment with different chart types in the Gallery, and choose one that best expresses your idea. Then use the information in this chapter to change the details of the design until you have exactly the chart you want.

Objects and Formats

You can change any format element by selecting an object and choosing the appropriate command. A chart may contain up to five types of objects, any of which you can select on the Chart screen:

Object:	What it is:
Chart	An entire chart (there may be one or many on the screen)
Axis	A line along which the values or categories are measured
Data series or point	The graphic representation of data on a chart
Label	Text or numbers identifying a part of the chart
Legend	A key showing the pattern or color for each data series

There may be more than one object of a particular type. For example, most charts have more than one axis, more than one data series, and more than one label.

Each type of object has a number of different parts, which you can change in appearance. To change the parts of an object, you first select the object and then use the appropriate command to change one or all of its parts. For example, tick marks and tick mark labels are parts of an axis. To change tick marks or tick mark labels, you first select the axis, then you choose the Format command from the Chart menu.

As soon as you start making more sophisticated charts, you will want to know which objects in a chart are on top of others. For example, when you place a legend with a white background in the middle of a plot area with grid lines, the legend covers the grid lines because the legend is on top of them. If there is more than one chart on the display, Chart draws all of chart 1, then all of chart 2, and so on.

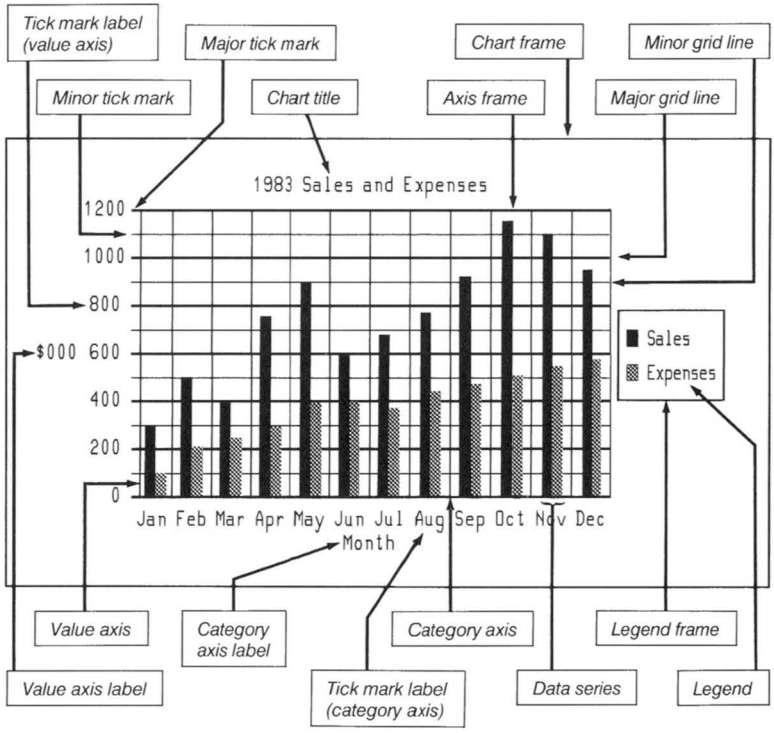


Figure 6.2. The Parts of a Chart

Chart draws the parts of a chart in the following order:

1. Chart frame, chart background
2. Axis background, axes, tick marks, grid lines, axis frame
3. Data series and points, drop lines, hi-lo lines, axis frame
4. Category tick labels, value tick labels
5. Free and dependent labels and arrows
6. Legend

Many of the commands from the Chart menu change the selected object in some way. When you choose a command, the proposed responses in the command fields show the current format of the object. You can change the format by changing the responses in the command fields. When you press the RETURN key, Chart redraws the chart with the new format. Details of how to change format are discussed in the following pages.

Selecting Objects

The selected object is indicated on the Chart screen both by the thick arrow (the "selection arrow") pointing to the object, and by the name (the "selection indicator") on the left side of the Chart screen status line.

To select an object:

1. Use the UP and DOWN keys to select the type of object you want.

   As you press the UP and DOWN keys, the name of the type of object changes in the selection indicator, and the selection arrow moves to one of the five types of objects on the chart.

2. Use the RIGHT and LEFT keys to select the object that you want.

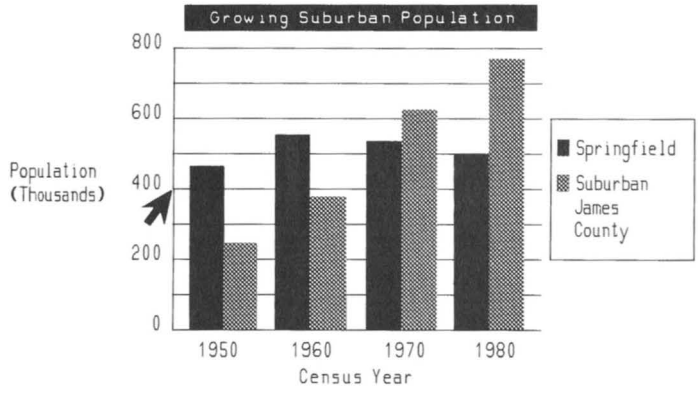
   As you press the RIGHT and LEFT keys, the object name in the selection indicator changes, and the selection arrow moves to each of the objects of the same type, for example, to each of the axes or to each of the labels.

When there is only one data series in a chart, you can select the individual points in the series. When a chart includes more than one data series, you can select the series, but not the individual points in the series.

When there is only one chart on the screen, no chart number appears in the selection indicator. When there is more than one chart, the selection indicator displays the number of the chart containing the currently selected object. For example, if the category axis in the first chart is selected, the selection indicator will display "Chart 1: Axis Category."

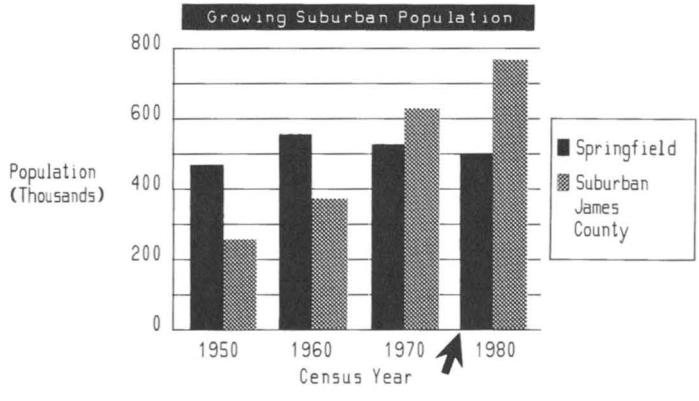
To select a chart, use the method described above for all objects, or, you can press the NEXT CHART key. If you have more than one chart, the selection arrow will then point to the lower left corner of the selected chart. The selection indicator displays the number of the chart containing the currently selected object and the name of the object (for example, "Chart 1:Chart").

Each time you press the NEXT CHART key, the selection arrow moves to the next chart and the chart number in the selection indicator changes (for example, "Chart 2:Chart"). If there is only one chart, the selection arrow does not appear when the chart is selected.



COMMAND: Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
Select option or type command letter
Axis Value 98% Free Microsoft Chart:

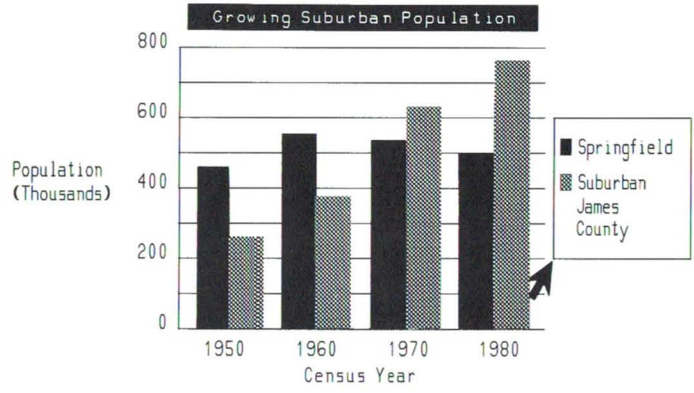
Axis Selected



COMMAND: Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
Select option or type command letter
Series/point 1:Springfield 98% Free Microsoft Chart:

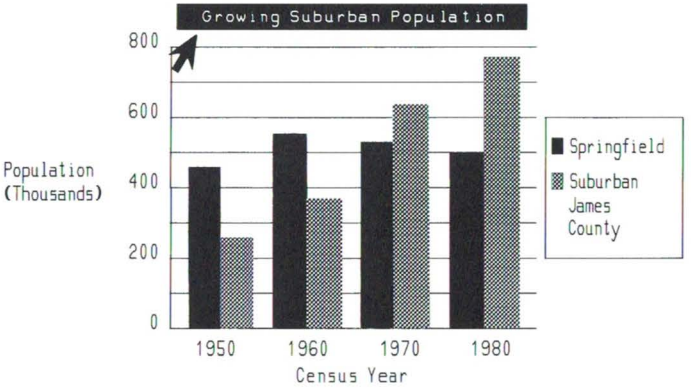
Series/point Selected

Figure 6.3. Selecting Objects in a Chart



COMMAND: Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
Select option or type command letter
Legend 98% Free Microsoft Chart:

Legend Selected



COMMAND: Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
Select option or type command letter
Label: Growing Suburban Population 98% Free Microsoft Chart:

Label Selected

Figure 6.3(Continued) Selecting Objects in a Chart

Master Objects

Each chart has three "master" objects:

1. Master series/point
2. Master series/point label
3. Master value label

Master objects do not appear on the chart, and the selection arrow does not appear when one of them is selected. They serve as models from which Chart draws all series/points, series/point labels, and value labels on the chart. If you want to change a format for all series in the chart, all series/point labels, or all value labels, you can do so in one operation by selecting a master object and choosing the command you want.

The master formats affect all objects of that type that you have not selected and altered individually. For example, if you change the pattern of one wedge of a pie chart, then select the master series/point and change its pattern, the patterns of all wedges, except the one that you changed before, will change.

Auto-Set Fields

Many command fields in Chart are immediately followed by a menu field that has two choices: *Auto* and *Set*. This Auto-Set field indicates that the contents of the previous field can be determined in either of two ways. *Auto* means that Chart will choose a reasonable value for the field, based on design principles, the data being charted, the capabilities of the display device, and the contents of fields in other menus. *Auto* is the default, or automatic, setting. It enables you to make a chart without having to specify every aspect of it. *Set* means that you have chosen a specific value, which the program will not change.

For example, the automatic setting for a legend is to place it on the right side of the chart. The legend is automatically spaced on the page so that it doesn't overlap with the rest of the chart. When you move the legend, however, the response in the Auto-Set field of the Move command changes to *Set*. You have specifically placed the legend somewhere other than where Chart would have placed it automatically. When the chart is redrawn, Chart will use the space previously reserved for the legend to make the plot area larger, as if the legend did not exist. When you choose *Set* in the Auto-Set field, proper positioning and sizing of an object like a legend is up to you.

As soon as you change the response in a field that has an accompanying Auto-Set field, the response in the Auto-Set field changes to *Set*. This ensures that your selection will not be changed by Chart. If you have changed the entry in a field with an Auto-Set field and decide later that you want the program to choose a value instead, choose *Auto* in the Auto-Set field.

Controlling Redraw

Each time you choose a command from the Chart menu and press the RETURN key, Chart redraws the chart. This allows you to see immediately the effect of the changes you make. In addition, any command whose set of command fields is more than two lines high will obscure part of the chart you are revising. The chart will be redrawn when you press the RETURN key to carry out the command or the CANCEL key to cancel the command.

You can speed up your work by asking that the chart not be redrawn except when you request it. This is especially useful if you are making extensive changes to a chart.

To turn the redraw feature off:

1. Choose the Options command.
2. Choose *No* in the "redraw chart" field.
3. Press the RETURN key.

To redraw the chart on the screen:

1. Return to the Chart screen if it is not currently displayed.
2. Press the REDRAW key.

Changing Color, Pattern, and Line Weight

A pattern is the way a line, or an area enclosed by lines, is drawn. Patterns may be drawn in any available color. Lines may have one of three thicknesses or weights: light, medium, or heavy.

To change pattern, color, or line weight:

1. Use the direction keys to select the object whose part you want to change.
2. Choose the Format command.
3. Choose *Pattern*, *Color*, or *Weight*.
4. Move to the command field for the part of the object you want to change.
5. For the Format Pattern and Format Color commands, use the direction keys to choose a pattern or color. For the Format Weight command, choose *Light*, *Medium*, or *Heavy*.

6. Repeat steps 4 and 5 for any other parts you want to change.

7. Press the RETURN key.

For more information on color, pattern, and line weight, see the Format Color, Format Pattern, and Format Weight commands in Chapter 9, "Command Directory".

Moving Objects and Changing Size

You can change the position and size of objects with frames by selecting the objects and using the Move and Format Size commands. All objects, except data series and data points, have frames, though a frame may not be visible if its pattern is Clear. See the Format Type command (chart selected) in Chapter 9 for examples of frame types.

Labels may also be positioned relative to other objects. See "Labels" in this chapter for details.

When Chart creates a new chart, the positions and sizes of all objects with frames are calculated automatically. Chart takes the legend, the chart title, and the category and value axis labels into account when calculating how much space is available for the plot area. The plot area is the smallest rectangle enclosing the axes.

If you move one of these objects with the Move command, its position becomes set. Chart will then assume that you are controlling the object's position and use the space normally reserved for the object to make the plot area larger. If you don't want the plot area to increase automatically, you can set its size with the Format Size command.

The following procedures describe how to set and change the position and size of an object with a frame. Later sections in this chapter give more information on various parts of a chart, including how to position and size some parts which do not have frames.

To set the position or size of an object with a frame:

1. Use the direction keys to select the object.

   Select either axis to set the position or size of the plot area.

2. Choose the Move or Format Size command.

3. Choose *Set* in the Auto-Set field.

4. Press the RETURN key.

To move an object with a frame:

1. Use the direction keys to select the object.

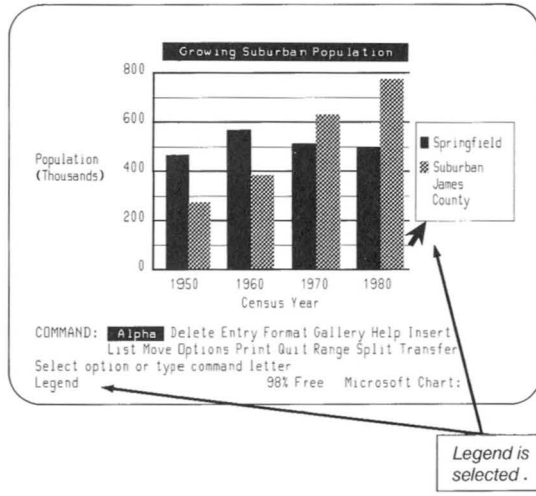
2. Choose the Move command.

3. Press the direction keys to move the object slightly. Press the PAGE RIGHT, PAGE LEFT, PAGE UP, and PAGE DOWN keys to move it by larger amounts.

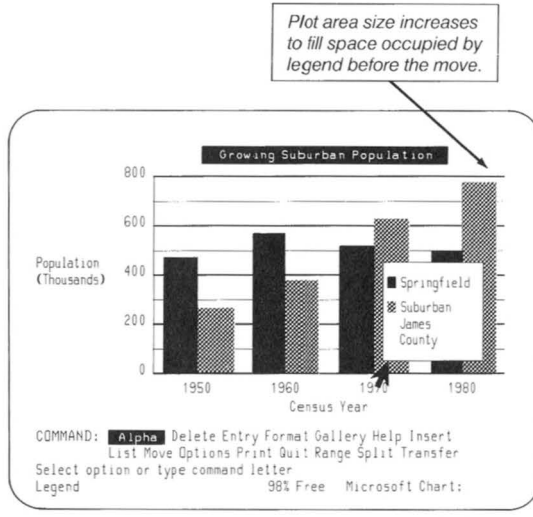
   An outline corresponding to the position of the object appears on the screen.

4. When the outline is where you want the object to be, press the RETURN key.

The response in the "position" field of the Move command indicates the position of the object as measured from the lower left corner of the device you indicate in the "display" field of the Options command. See Chapter 8, "Saving and Printing Charts," for details.



Before Moving Legend



After Moving Legend

Figure 6.4. Moving the Legend

To change the size of an object with a frame:

1. Use the direction keys to select the object.

2. Choose the Format Size command.

3. In the "width" field, press the RIGHT or LEFT keys to make the object slightly wider or narrower. Press the PAGE RIGHT or PAGE LEFT keys to make it wider or narrower by larger amounts.

   When you first press the keys, an outline corresponding to the size of the object appears on the screen. As you press the keys, the outline changes in size, showing you how large the object will be when the chart is redrawn.

4. In the "height" field, press the UP or DOWN keys to make the object slightly taller or shorter. Press the PAGE UP or PAGE DOWN keys to make the object taller or shorter by larger amounts.

5. When the outline is the size you want the object to be, press the RETURN key.

Removing Objects and Putting Them Back

With the Delete command, you can delete labels, legends, data series and entire charts. Although you cannot delete certain parts of a chart, you can make some of them invisible with the Format Pattern command. An invisible object is still present, but is completely transparent. Deleting an object actually removes it from the chart. You can put back some deleted objects with the Insert commands.

If Chart is automatically controlling the size of the plot area, and you delete the legend, the chart title, or the category or value axis labels, Chart will use the space normally reserved for the object to make the plot area larger. If you don't want the plot area to increase automatically, set its size with the Format Size command.

The following procedures describe how to delete objects, insert deleted objects, and make objects invisible. Later in this chapter are sections giving more information on various parts of the chart.

To delete a label, legend, data series, or chart:

1. Use the direction keys to select the object.

2. Choose the Delete command.

3. Type *Y* (for Yes) to confirm the command.

You can delete a chart only when there is more than one. When you delete a chart, it is stored in a special area of memory called the scrap. You can put a deleted chart back by choosing the Insert Scrap Chart command. The scrap holds only one chart, the one most recently deleted. For information on multiple charts, see Chapter 7, "Working With More Than One Chart."

When you delete a label, it too is stored in the scrap. The scrap holds all the labels you delete; the Insert Scrap Labels command will put all of them back.

You can put back a deleted legend, or insert a legend into a chart that never had one, with the Insert Legend command.

When you delete a data series from a chart, the series is not actually deleted from the List; it is merely marked for exclusion (-) from the chart. To reinsert the series, select it in the List and type an asterisk (*) to mark it for inclusion.

Some parts of the chart are actually part of one of the five main chart objects. For example, a legend's frame is part of the legend. You cannot remove it from the Chart but you can make it invisible.

To make part of an object invisible:

1. Use the direction keys to select the object the part belongs to.

2. Choose the Format Pattern command.

3. Use the direction keys to choose the Clear pattern in the command field for the part you want to make invisible.

   Each time you press a direction key, a different pattern name appears in the command field.

4. Press the RETURN key.

Tick marks, tick mark labels, and markers do not have patterns. To make them invisible:

1. Select the axis or series/point.

2. Choose the Format Type command.

3. Choose *None* in the command field for the part you want to make invisible.

4. Press the RETURN key.

You can make the object or part visible again by changing its pattern to anything other than Clear or its type to anything other than None.

Charts

As with all objects with frames, you can control the absolute position and size of a chart with the Move and Format Size commands. You can choose the color, pattern, and line weight of the frame and background with the Format Color, Format Pattern, and Format Weight commands. See "Changing Color, Pattern, and Line Weight" and "Moving Objects and Changing Size" in this chapter for details.

You can change chart types with the Gallery command or with the Format Type command (chart selected).

To change chart types with the Format Type command:

1. Use the direction keys to select the entire chart.

2. Choose the Format Type command.

3. Choose a chart type in the "type" field.

4. Respond appropriately in the "vary by categories," "100%," "stacked," "pie start angle," "cluster spacing %," "bar spacing %," and "overlap" fields. See the discussion of these fields in the "Data Series and Data Points" section.

5. Press the RETURN key.

The data that appears in the chart are those series on the List screen that are marked for inclusion. They appear in the chart in the same order in which they appear in the List.

From the Chart menu, you can also control which data series appear in the chart and the order in which they appear by using the Format Type command with the entire chart selected. This method of controlling the data assigned to a chart is recommended if there is more than one chart on the screen. See Chapter 7, "Working With More Than One Chart."

To control the data assigned to the chart from the Chart menu:

1. Use the direction keys to select the entire chart.

2. Choose the Format Type command.

3. Type a list of series numbers separated by commas in the "series" field. Each number represents a series number as shown on the List screen. The series will appear in the chart in the order in which you type them, regardless of their order in the List.

Note

The "series" field is followed by an Auto-Set field. The response changes to *Set* when you begin typing in the "series" field. Choose *Auto* in the Auto-Set field if you want Chart to assign the data series based on their order in the List and whether they are marked for inclusion or exclusion.

---

4. Press the RETURN key.

Creating Text-only Charts

You can create charts that have only labels in them, and no data. Since labels have text, frames, and arrows whose font, size, position, color, pattern, line weight, and type you can control, you can create elaborate diagrams with text-only charts.

To create one text-only chart:

1. Clear the data and chart format using the Transfer Clear All command.

2. If you are not already in the Chart menu, choose the Chart command.

3. Use the Insert New-Label command to insert as many labels as you want.

   Each new label you insert will be positioned in the upper left corner of the chart. Use the Move command to move each label within the chart. Format and edit the labels, as described in the "Labels" section of this chapter.

You may also want to create a label chart when there are several charts on the screen. This is especially useful for creating a title or explanation that is positioned outside the boundary of any one chart. Since objects within a chart are restricted to the boundaries of the chart frame, the best way to create a title for several charts is to create a separate chart that contains only the title.

To create a text-only chart when there is more than one chart:

1. Use the Insert Chart New command to add a new chart.

2. Choose the Format Type command.

3. Type *0* (zero) in the "series" field.

4. Press the RETURN key.

5. Choose the Insert New-Label command to add labels and use other commands as described above for single text-only charts.

See Chapter 7, "Working With More Than One Chart," for more information on multiple charts.

Saving and Reusing Chart Formats

Once you have revised your chart to create a format that appeals to you, you will probably want to use it again with different data. Using the same formats is a good way to keep a consistent style among the charts you create. Chart lets you save any chart format you have created, and then reuse it with any data you have. You can build your own collection of chart formats that you can use almost as easily as those in the Gallery.

To save a chart format and all the data series, use the Transfer Save command. To save only the format, first clear the data using the Transfer Clear Data command, then use the Transfer Save command. In either case, you can apply the format from a saved file to new data.

To apply the saved format in the file to your current data, use the Transfer Load command:

1. Choose the Transfer Load command.

2. Use the direction keys to display and choose the file from a list of filenames, or type the name of the file.

3. Choose *Format* in the "load" field.

4. Press the RETURN key.

The new chart format is loaded, replacing the current chart format, but leaving the current data series unaffected. When you load a chart format, it is still intact in its saved file; it has merely been copied to replace the current format.

In general, leave as many Auto-Set fields as possible on *Auto*. The automatic settings allow Chart more freedom to adjust the format as required to accommodate new data.

Leave the fields in the Range command on the automatic settings, unless you are certain that all the data you plan to use with the chart format falls within the range you are specifying. If new data falls outside the range you have set, it will not appear on the chart.

You can use the master objects to control the formats of series/points, series/point labels, and value labels. When you use the master objects, you do not need to be concerned about whether the number of data series or data points used with the chart will always be the same. You can control the format of objects without having to know how many of them will be present in the chart.

This is an extremely powerful feature that allows you to use saved formats with a wide variety of data. Chart applies the master object formats to all series/points, series/point labels, and value labels that have not been individually selected and formatted.

If you want to change an axis label or chart title, use the Name command to change the names rather than using the Alpha command on the Chart menu. The Name command changes the data but does not affect the chart format, so if the format is used with other data, the label text will come from the new data. The Alpha command breaks the link between the contents of a label and the name in the data that provided the original text.

Label text that you insert with the Insert New-Label command and change with the Alpha command becomes part of the chart format. Thus, when you load a format and use it with new data, the labels that were appropriate with the original data may no longer be appropriate. You can edit or delete them.

Try to keep labels and legends out of the plot area of reusable formats. Placement within the plot area may be appropriate with some data, but may overlap data and interfere when the data is different.

Axes

All charts except pie charts have two perpendicular axes called the category axis and the value axis. The smallest rectangle enclosing the axes forms the axis frame. The area enclosed by the axis frame is the plot area. Axes have the following parts: tick marks, tick mark labels, and grid lines.

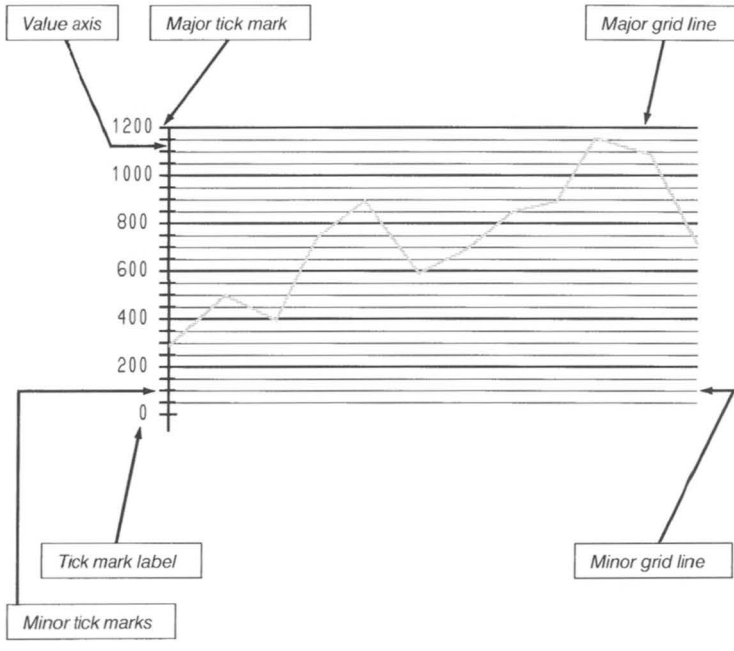


Figure 6.5. Parts of an Axis

As with all objects with frames, you can control the absolute position and size of the axes with the Move and Format Size commands and the color, pattern, and line weight of the frame and plot area with the Format Color, Format Pattern, and Format Weight commands. See "Changing Color, Pattern, and Line Weight" and "Moving Objects and Changing Size" in this chapter for details.

A pie chart does not actually have axes, but it does have a frame and a plot area. The plot area of a pie chart is the smallest rectangle enclosing the pie. To move, position, or format a pie chart, you can select its frame just as you would the axis frame of any other type of chart. When you select the frame of a pie chart, the selection indicator says "Axis None."

Note

Several times in the discussion of axes we give one procedure for value axes, and another for category axes. The procedures described for value axes also apply to the category axes of scatter charts. The procedures described for category axes apply to all category axes except those of scatter charts.

Tick Marks

Axes have major and minor tick marks spaced at constant intervals. There are four types of tick marks:

Type	Location
Cross	Tick marks cross the axis.
Inside	Tick marks extend from the axis into the plot area.
Outside	Tick marks extend from the axis out of the plot area.
None	Tick marks are invisible.

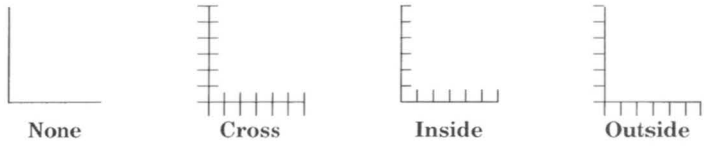


Figure 6.6. Tick Mark Types

Chart normally draws cross tick marks.

To change the type of tick mark or to make tick marks invisible:

1. Use the direction keys to select the axis whose tick marks you want to change.

2. Choose the Format Type command.

3. Choose *Cross*, *Inside*, *Outside*, or *None* in the "major tick marks" field.

4. Choose *Cross*, *Inside*, *Outside*, or *None* in the "minor tick marks" field.

5. Press the RETURN key.

Tick marks always have the same color, pattern, and line weight as the axis. If you make an axis invisible by changing its pattern to Clear, the tick marks will also disappear.

Tick Mark Labels

Major tick marks have tick mark labels. You can specify one of four general locations for tick mark labels:

Type	Location
Axis	Next to the axis
Low	Just outside the plot area at the low end of the other axis
High	Just outside the plot area at the high end of the other axis
None	Invisible

Chart always draws low tick mark labels when you first create a chart, unless you choose a chart type with axis tick mark labels from the Gallery.

In addition to specifying the general location of the tick mark labels, you can control their distance from the axis or the plot area. You set both location and distance in one procedure with the Format Type command.

To position the tick mark labels or to make tick mark labels invisible:

1. Use the direction keys to select the axis whose tick mark labels you want to position.

2. Choose the Format Type command.

3. Choose *Axis*, *Low*, *High*, or *None* in the "labels for tick marks" field.

4. In the "label distance" field, type a measurement in inches or centimeters for the distance between the label and the axis or plot area. The number may be negative.

5. Press the RETURN key.

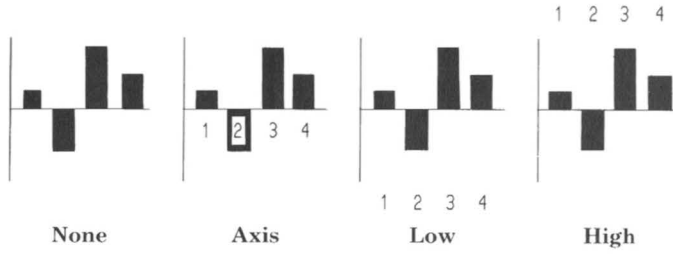


Figure 6.7. Tick Mark Label Positions

Tick mark labels are derived from the categories and values of the data series.

- You can change the appearance of the labels, including alignment, number format, and date format, with the Format Value or Format Category commands on the List or Entry menus. See "Formatting Data Points" in Chapter 5 for details.

- You can control the color of the tick mark labels with the Format Color command. See "Changing Color, Pattern, and Line Weight" in this chapter.

- You can change the font and font size of tick mark labels with the "tick mark font" and "size" fields of the Format Type command, just as you would change the font and font size of the text in legends and labels. See "Fonts" in this chapter.

Grid Lines

Major and minor grid lines extend from the major and minor tick marks on the axis through the plot area. You can control the color, pattern, and weight of the grid lines with the Format Color, Format Pattern, and Format Weight commands, respectively. See "Changing Color, Pattern, and Line Weight" in this chapter.

Unless you choose a chart form with grid lines from the Gallery, the pattern for grid lines is Clear. To add grid lines, choose a chart type with grid lines from the Gallery, or specify a pattern other than Clear in the Format Pattern command.

See the area, bar, column, line, and scatter galleries for examples of charts with grid lines.

Changing the Intersection of the Axes

By selecting either axis and using the Move command, you can change the position of the entire plot area. To move the axes relative to each other within the plot area, use the Range command to change the points at which they cross.

For example, you might want the category axis to cross the value axis at a value representing the mean of the data, rather than at the low end of the value axis. This change would draw attention to the deviation of the data from the mean.

To change the point on the value axis at which the category axis crosses:

1. Use the direction keys to select the value axis.

2. Choose the Range command.

3. Enter the value at which you want the other axis to cross in the "axis crosses" field.

4. Press the RETURN key.

For category axes, you can control both the category at which the value axis crosses and whether the value axis crosses through the center of the category or between the category and the previous category. For bar and column charts, the value axis normally crosses the category axis between categories. For area and line charts, the value axis normally crosses the category axis through the center of a category.

To change the point on the category axis at which the value axis crosses:

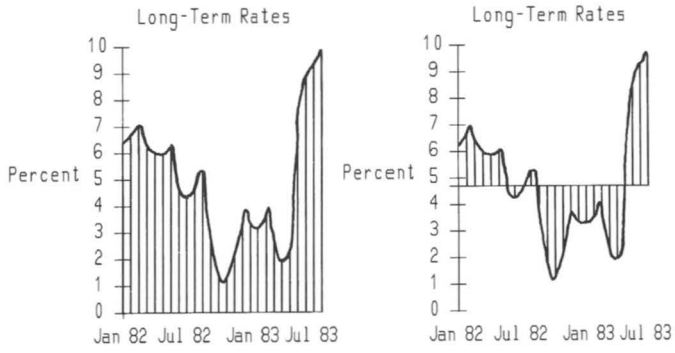
1. Use the direction keys to select the category axis.

2. Choose the Range command.

3. Enter the category at which you want the value axis to cross in the "axis crosses at category #" field or choose *Yes* in the "maximum" field if you want the value axis to cross at the maximum category.

4. Choose *Yes* in the "between points" field if you want the value axis to cross between categories. Choose *No* if you want the value axis to cross through the center of a category.

5. Press the RETURN key.



Crossing at 0

Crossing Changed to Emphasize Difference of Data From Median

Figure 6.8. Changing the Axis Crossing

Changing the Intervals Between Tick Marks

On the value axis, you can control the intervals between the major and minor tick marks with the Range command. Each major tick mark has a tick mark label. The major and minor grid lines occur at the major and minor tick marks. By controlling the intervals between the tick marks, you also control the intervals between the tick mark labels and between the grid lines.

To change the tick mark intervals on a value axis:

1. Use the direction keys to select the value axis.

2. Choose the Range command.

3. Type a number for the major interval in the "major interval" field.

4. Type a number for the minor interval in the "minor interval" field.

   The intervals start at the minimum value specified in the "minimum value" field of the Range command. For example, if the minimum value is -100 and the major interval is 50, the major tick marks will occur at -100, -50, 0, 50 and so on. If the minor interval is 25, the minor tick marks will occur at -100, -75, -50, -25 and so on.

5. Press the RETURN key.

On the category axis, the intervals between the tick marks are fixed. If you chose *Yes* in the "between points" field of the Format Type command, the major tick marks occur between the categories and the minor tick marks occur at the centers of the categories. If you chose *No*, the major tick marks occur at the centers of the categories and the minor tick marks occur between the categories. However, you can control the interval between the tick mark labels.

To change the tick mark label intervals on the category axis:

1. Use the direction keys to select the category axis.

2. Choose the Range command.

3. Type a number for the label interval in the "label interval" field.

   1 means every category will be labeled, *2* means every second category, and so on.

4. Press the RETURN key.

Controlling the Range of Values Displayed

Changing the range of values is one of the most effective ways to emphasize different aspects of your data. For example, making the range of values very narrow emphasizes the fluctuation of the data within that range.

On the value axis, Chart normally displays a range of values beginning with zero (or just below the lowest value in the included series) and ending just above the highest value. You can change the minimum and maximum values with the Range command.

To change the range of values on a value axis:

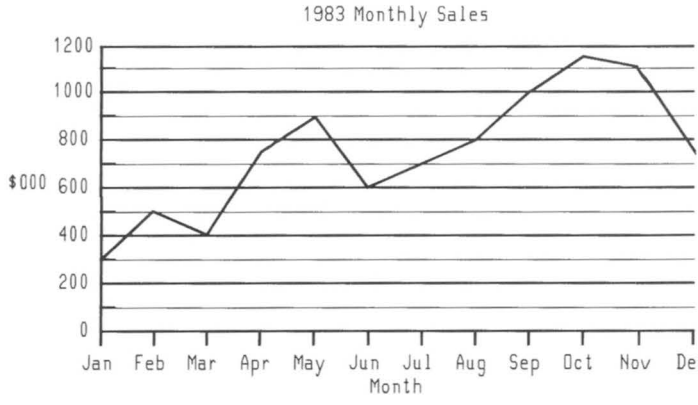
1. Use the direction keys to select the value axis.

2. Choose the Range command.

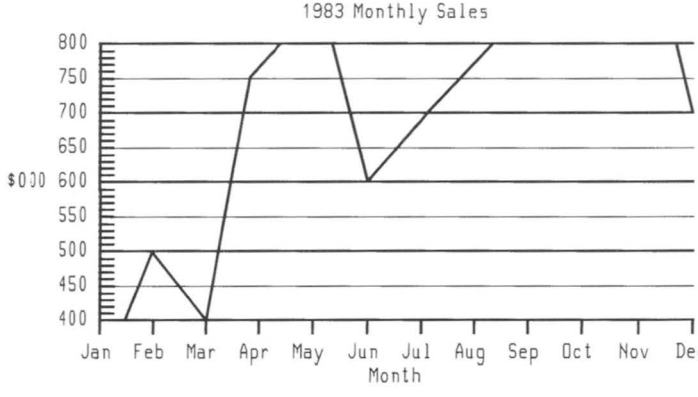
3. Type a number for the lowest value you want displayed in the "minimum value" field. The number may be negative.

4. Type a number for the highest value you want displayed in the "maximum value" field. The number may be negative.

5. Press the RETURN key.



Original Chart



Range Changed to Emphasize Portion of Data

Figure 6.9. Changing the Range of the Value Axis

Reversing the Scale

Reversing the scale changes the ordering of values or categories from low-to-high to high-to-low or from left-to-right to right-to-left. It also reverses the position of data points (columns, bars, etc.) to maintain the accuracy of the chart.

To reverse the scale for either axis:

1. Use the direction keys to select the axis whose scale you want to reverse.

2. Choose the Range command.

3. Choose *Yes* in the "reversed" field.

4. Press the RETURN key.

Logarithmic Scales

It is possible to have Chart calculate a logarithmic scale for the value axis (and for the category axis in a scatter chart).

To make the scale of a value axis (or category axis in a scatter chart) logarithmic:

1. Use the direction keys to select the axis.
2. Choose the Range command.
3. Choose *Yes* in the "logarithmic scale" field.
4. Press the RETURN key.

The effects of some of the other fields in the Range command are different when the scale is logarithmic. See the Range command (value axis selected) in Chapter 9, "Command Directory" for more information. See the line and scatter galleries for examples of charts with logarithmic scales.

Omitting the Scale

Although you cannot omit the scale from an axis, you can use the Format Type command to make the tick marks and tick mark labels invisible.

Data Series and Data Points

Chart presents data points in four different graphic forms:

1. Bars and columns, used in bar and column charts
2. Markers and lines, used in line and scatter charts
3. Wedges, used in pie charts
4. Areas, used in area charts

See the Gallery command in Chapter 9 for examples of each of these forms.

You can control the color, pattern, and weight of lines, markers, borders, and backgrounds with the Format Color, Format Pattern, and Format Weight commands. See "Changing Color, Pattern, and Line Weight" in this chapter for details.

Bars and Columns

When the entire chart is selected, you can control the spacing between clusters of bars or columns along the category axis, and the spacing or overlap between bars or columns within clusters. See the bar and column galleries for examples of overlapped bars and columns.

To change the spacing between clusters of bars or columns:

1. Use the direction keys to select the entire chart.

2. Choose the Format Type command.

3. In the "cluster spacing %" field, type a number for the spacing between clusters of bars or columns. The number represents a percentage of the width of the bars or columns themselves.

4. Press the RETURN key.

To change the spacing between bars or columns, or to make the bars or columns overlap, choose an appropriate chart form from the Gallery, or:

1. Use the direction keys to select the entire chart.

2. Choose the Format Type command.

3. In the "bar spacing %" field, type a number for the spacing between bars or columns. The number represents a percentage of the width of the bars or columns themselves.

4. Choose *Yes* in the "overlap" field if you want the bars or columns to overlap by the amount specified in the "bar spacing %" field. Choose *No* if you want the bars or columns to be separated by that amount.

5. Press the RETURN key.

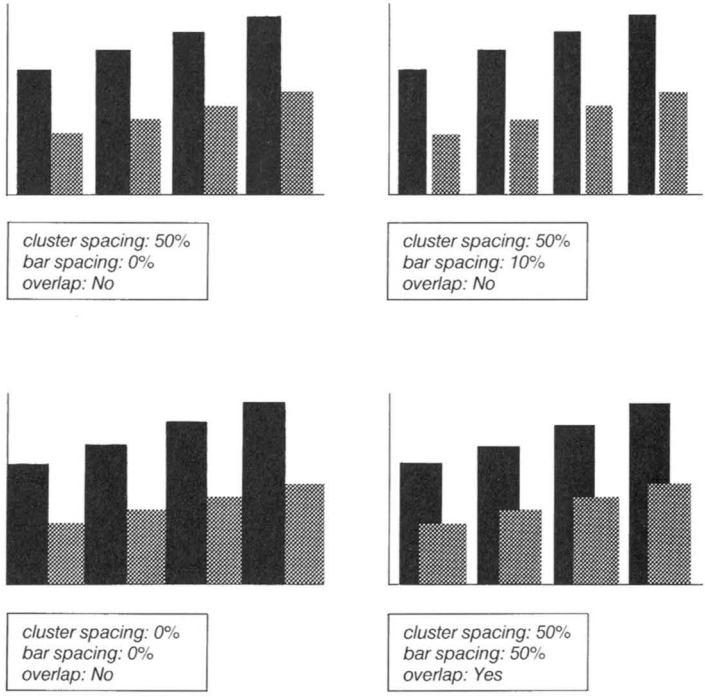


Figure 6.10. Bar and Cluster Spacing

If you create a bar or column chart with only one data series, Chart will give all of the bars or columns the same pattern, unless you choose a chart form with varied categories from the Gallery. To vary the patterns, you can choose a chart type with varied patterns from the Gallery, select and pattern the individual bars or columns using the Format Pattern command, or use the Format Type command.

To vary the patterns using the Format Type command:

1. Use the direction keys to select the entire chart.

2. Choose the Format Type command.

3. Choose *Yes* in the "vary by categories" field.

4. Press the RETURN key.

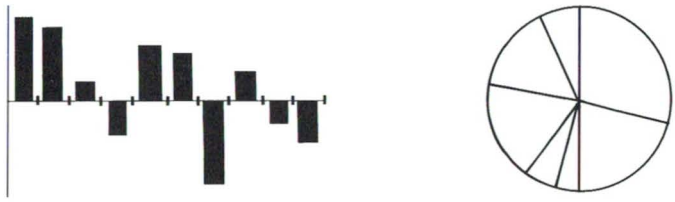


Chart Patterns Not Varied by Category

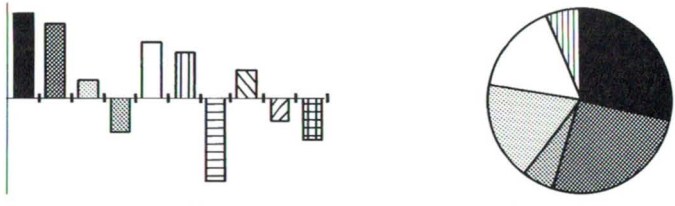


Chart Patterns Varied by Category

Figure 6.11. Varying Chart Patterns by Category

Wedges in Pie Charts

You can "explode" or move a wedge out of a pie with the Format Type command. You can also rotate the entire pie with this command.

To explode a wedge of a pie chart:

1. Use the direction keys to select the wedge you want to explode.

2. Choose the Format Type command.

3. In the "explode distance %" field, type a number for the amount by which the wedge is to be exploded. The number represents a percentage of the length of the radius of the pie.

4. Press the RETURN key.

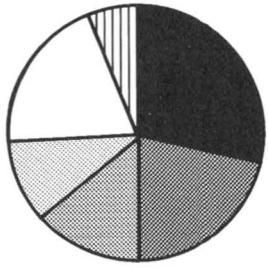
To rotate a pie:

1. Use the direction keys to select the entire chart.

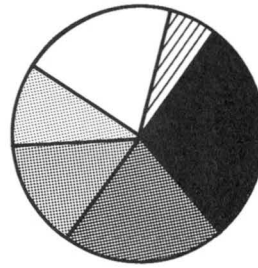
2. Choose the Format Type command.

3. Type a number in the "pie start angle" field. The number represents the angle between the leading edge of the first wedge and the twelve o'clock position (zero), measured clockwise.

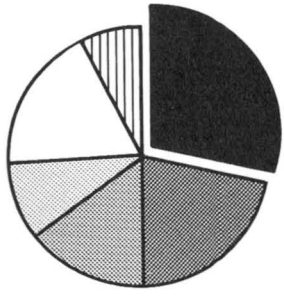
4. Press the RETURN key.



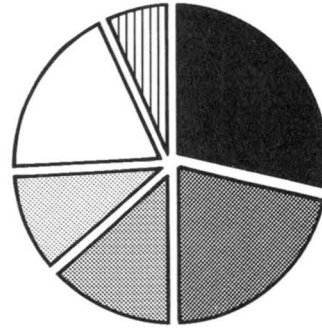
Pie Chart



Pie Chart Rotated



Pie Chart with
One Wedge Exploded



Pie Chart with
All Wedges Exploded

Figure 6.12. Exploded and Rotated Pie Charts

When you create a pie chart by choosing any example except number 2 from the pie gallery, the patterns of the wedges will be varied automatically. If you use the Format Type command to change the chart type to a pie, you should also choose a response for the "vary by categories" field. If you choose *No*, all the wedges will have a Clear pattern with a Solid border. If you choose *Yes*, each wedge will have a different pattern, as they do in the pie gallery.

To change the chart type to a pie chart with wedges with varied patterns:

1. Select the entire chart.
2. Choose the Format Type command.
3. Choose *Pie* in the "type" field.
4. Choose *Yes* in the "vary by categories" field.
5. Press the RETURN key.

Lines and Markers

In line and scatter charts, each data point is represented by a "marker," rather than by an area, bar, column, or wedge. You can choose to have any of the following appear:

- Markers and lines
- Markers only
- Lines only
- Neither markers nor lines

Markers always have the same color as the connecting line(s) for that series/point. You control the shape of the markers with the "type of marker" field in the Format Type command. You can remove markers by choosing *None* for the type of marker. See the line and scatter galleries for examples of charts with markers.

To add, remove, or change the type of markers for one series (if there are more than one series) or one data point (if there is only one series), choose an appropriate form from the scatter gallery or:

1. Use the direction keys to select the series/point.
2. Choose the Format Type command.

3. Use the direction keys to choose a type of marker in the "type of marker" field. Each time you press a direction key, a different marker name appears in the command field. Choose *None* if you want to remove markers.

4. Press the RETURN key.

To add, remove, or change the type of markers for all series (if there are more than one series) or all data points (if there is only one series), choose an appropriate form from the scatter gallery or:

1. Use the direction keys to select the master series/point.

2. Choose the Format Type command.

3. Use the direction keys to choose a type of marker in the "type of marker" field. Each time you press a direction key, a different marker appears in the command field. Choose *None* if you want to remove markers.

4. Press the RETURN key.

The normal pattern for connecting lines in a line chart is Solid. To remove lines, specify *Clear* for the pattern in the Format Pattern command. The normal pattern for connecting lines in a scatter chart is Clear. To add lines, specify a pattern other than Clear in the Format Pattern command. See "Changing Color, Pattern, and Line Weight" in this chapter.

Stacked or 100% Charts

For area, bar, column, and line charts, you can specify that the data points be stacked on top of each other. This draws attention to the combined contribution of data points in different series with the same categories. Or you can specify that the stacked areas, bars, or columns be scaled to 100% to draw attention to the relative contribution of the data points in different series with the same categories.

Stacked or 100% bar and column charts are common. Almost all area charts, but almost no line charts, are stacked or 100%. See the area, bar, and column galleries for examples of stacked or 100% charts.

To make a chart stacked or 100%, choose an appropriate chart form from the Gallery or:

1. Use the direction keys to select the entire chart.
2. Choose the Format Type command.
3. Choose *Yes* in the "100%" field if you want a 100% chart. Choose *No* if you want a simple stacked chart.
4. Choose *Yes* in the "stacked" field.
5. Type *100* in the "bar spacing %" field.
6. Choose *Yes* in the "overlap" field.
7. Press the RETURN key.

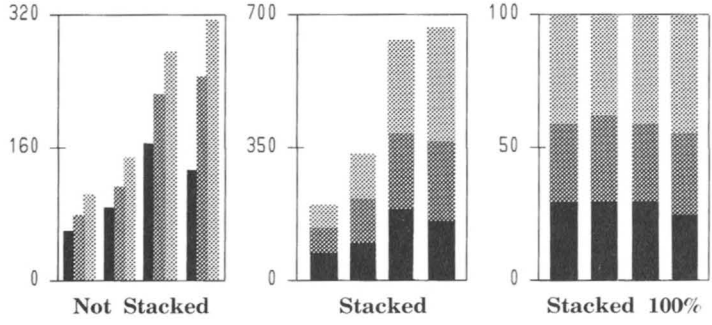


Figure 6.13. Stacked Column Charts

Hi-lo Lines and Drop Lines

You can add hi-lo lines to line charts, and drop lines to area and line charts. Hi-lo lines extend from the highest to the lowest data point in each category. Drop lines extend from the highest and lowest data points in each category to the axis.

You control the color, pattern, and weight of hi-lo and drop lines by selecting the entire chart and choosing the Format Color, Format Pattern, or Format Weight commands respectively. See "Changing Color, Pattern, and Line Weight" in this chapter for details. To add hi-lo lines to a chart, you can either choose *HiLo* in the Gallery, or change the pattern of the hi-lo lines to anything other than Clear in the Format Pattern command.

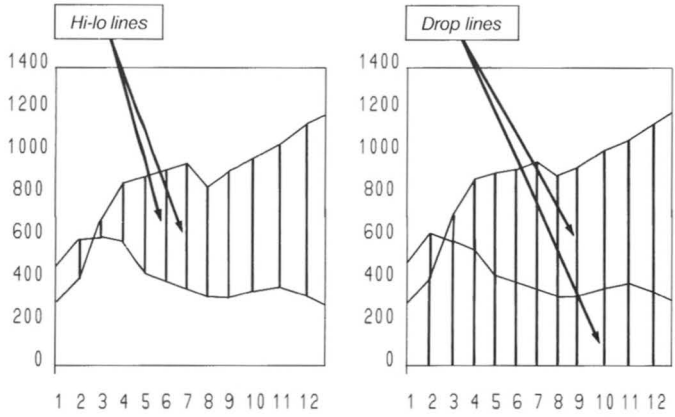


Figure 6.14. Hi-Lo Lines and Drop Lines

Deleting, Inserting, and Moving Data Series and Data Points on the Chart

When a chart contains more than one data series, you can select a series and delete it from the chart with the Delete command. The series is not deleted from the List, but it is marked for exclusion (-) from the chart.

To put the series back in the chart, or to include another series displayed in the List, you select the series on the List screen and type an asterisk (*). The next time you view the chart, the series will be included. Or you can create and include a new series using any of the methods described in Chapter 5, "Preparing Data for a Chart."

To delete or insert an individual data point in a chart, select the proper data series on the chart, choose the Entry command, and then delete or insert the data point on the Entry screen, using any of the methods described in Chapter 5.

The order in which data points appear on the Entry screen determines the order in which they appear in the chart. The order in which included series appear in the List determines the order in which they appear in the chart. You move data series and data points in the chart by changing their order on the List and Entry screens. See "Moving Data Series" and "Moving Data Points" in Chapter 5.

You can also control the order in which series appear with the Format Type command (chart selected). The "series" field gives the series numbers, as shown on the List screen, of the data series in the selected chart. You can edit this list, indicating both which series should be in the selected chart and their order. For example, if you want series numbers 3 and 2 from the List to be the first and second series in the chart, you select the chart and then enter *3,2* in the "series" field of the Format Type command (chart selected). The specified series will be charted even if they are marked for exclusion (-) in the List.

Labels

There are two kinds of selectable labels in Chart:

1. Free labels

2. Dependent labels.

A label is free if the response in the "label for" field of the Format Type command is *Free*. A free label can be positioned anywhere on the screen with the Move command.

A dependent label is associated with or respresents one of the items in the "label for" field: category axis, series/point, title, or value axis. A dependent label will move with the object it is associated with; Chart automatically controls its position. Once you have moved a label with the Move command, it becomes free and its position is set.

Chart automatically inserts three dependent labels when you first create a chart: a label for each axis and a title for the chart. (For pie charts, Chart inserts only a label for the title.) The category and value axis labels are associated with the category and value axes respectively. The title label is associated with the chart.

When the response in the "text" field of the Format Type command is *Auto*, the text for these labels is taken from the names of the first included data series in the chart. You can change the text for one of these labels either by changing the names of the first included series with the Name command on the List or Entry menus, or by editing the label with the Alpha command on the Chart menu. If you edit the label, its text becomes set and loses its connection with the data.

Tick mark labels are not selectable. They are part of the axis whose tick marks they identify. See "Tick Mark Labels" in this chapter for more information.

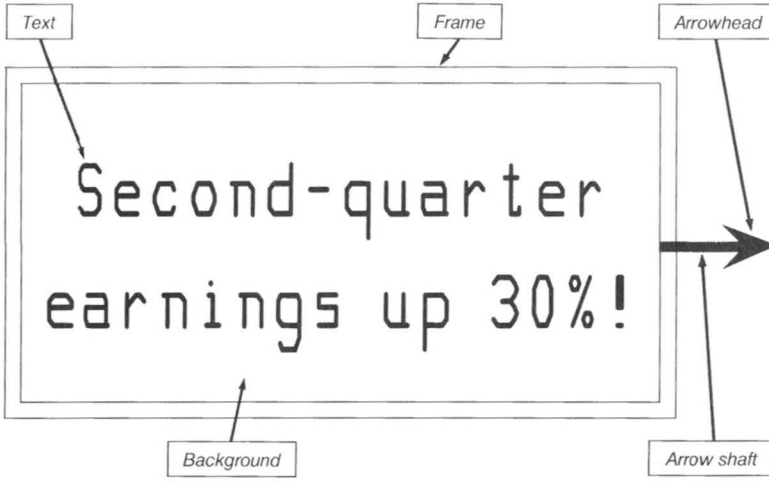


Figure 6.15. Parts of a Label

Every selectable label has a frame and an arrow, although the arrow is at first invisible. See "Arrows" later in this chapter for more information about arrows.

Inserting and Deleting Labels

You can insert new free or dependent labels with the Insert New-label command. Because you type the text of a new label directly, it is set in the "text" field of the Format Type command and will stay as you typed it until you change it.

To insert a free label:

1. Choose the Insert New-label command.

2. Type the text for the label.

3. Press the RETURN key.

   Chart inserts the new label in the upper left corner of the plot area and selects it at the same time. To move it, see "Moving Objects and Changing Size" in this chapter.

To insert a dependent label:

1. Choose the Insert New-label command.

2. Type the text for the label.

3. Press the RETURN key.

4. Choose the Format Type command.

5. In the "distance" field, type a measurement in inches or centimeters for the distance between the label and the object it will depend on.

6. In the "label for" field, choose which object you want the label to depend upon: category axis, series/point, title, or value axis.

7. If you chose *Series/point* in the "label for" field, move to the "series,point number" field and type the number of the series or the number of the series followed by a comma and the number of the point.

   If you type the number of the series alone, the label will depend upon the last data point in the series.

8. Press the RETURN key.

You can delete a label by selecting it and using the Delete command. Deleted labels are stored in a special area of memory called the scrap, from which they may be reinserted with the Insert Scrap Labels command. If you delete (or move) the title or one of the labels for the category or value axes, the additional space is used when the chart is redrawn. Otherwise, the only effect on the chart is that the label is deleted.

You can control other formats of both free and dependent labels with the Format Type command. See the Format Type command (label selected) in Chapter 9, "Command Directory," for details.

Editing Labels

You can edit any selectable label directly with the Alpha command. If you edit the text for a label, it becomes set in the "text" field of the Format Type command. This makes the text of the label free of any automatic connection with the names or data of a data series.

For example, if you edit the category label, its text will no longer be connected with the category name of the first included data series in the chart.

To edit a label:

1. Use the direction keys to select the label.

2. Choose the Alpha command.

3. Retype the text or edit the proposed response just as you would edit the response in any fill-in command field.

4. Press the RETURN key.

You can have a label that is more than one line long by inserting "newline" characters in the text where you want it to be broken into lines. You insert a newline character (↓) by pressing the NEWLINE key when you are typing the label. For example, if you want to insert the following label on your chart

```
Growing Suburban Population
  (Springfield 1950-1980)
```

you should type the following in the Alpha command:

```
Growing Suburban Population↓(Springfield 1950-1980)
```

If you do not enter newline characters, Chart will automatically break long labels into more than one line.

Formatting Labels

As with all objects with frames, you can control the absolute position and size of the frame with the Move and Format Size commands, and the color, pattern, and line weight of the frame and background with the Format Color, Format Pattern, and Format Weight commands, respectively. You can also control the color of the text for a label. See "Changing Color, Pattern, and Line Weight" and "Moving Objects and Changing Size" in this chapter for details.

Series/point Labels and Value Labels

In addition to the three dependent labels that Chart automatically inserts, you can have dependent labels for the data series and points. A label is dependent upon a data series or point if the response in the "label for" field of the Format Type command is *Series/point*. The particular data series or point is entered in the "series,point number" field of the Format Type command.

You can insert a label that is dependent upon a data series or point just as you would insert any other dependent label. See "Inserting and Deleting Labels" in this chapter. You can also have Chart insert two special kinds of labels dependent upon data series or points: series/point labels and value labels.

When the response in the "text" field of the Format Type command is *Auto*, the contents of series/point and value labels come from the series data. Series/point labels show either the names of data series, or the categories of data points, depending on whether there is more than one series in the chart. Value labels always show the values of data points.

To add series/point or value labels for one series (if there are more than one series) or one data point (if there is only one series), choose an appropriate chart form from the Gallery, or:

1. Select the series/point.

2. Chose the Format Type command.

3. Choose *Yes* in the "series/point label" field or "value label" field.

4. Press the RETURN key.

If you chose *Yes* in the "series/point label" field, and there is more than one series in the chart, the selected series will be labeled with its series name. The label appears near the last data point in the series. If there is only one series, the selected data point will be labeled with its category.

If you chose *Yes* in the "value label" field, and there is more than one series in the chart, each data point in the selected series will be labeled with its value. If there is only one series, only the selected data point will be labeled with its value.

To add labels for all series (if there are more than one series) or all data points (if there is only one series), choose an appropriate chart form from the Gallery, or:

1. Select the master series/point.

2. Choose the Format Type command.

3. Choose *Yes* in the "series/point label" field or "value label" field.

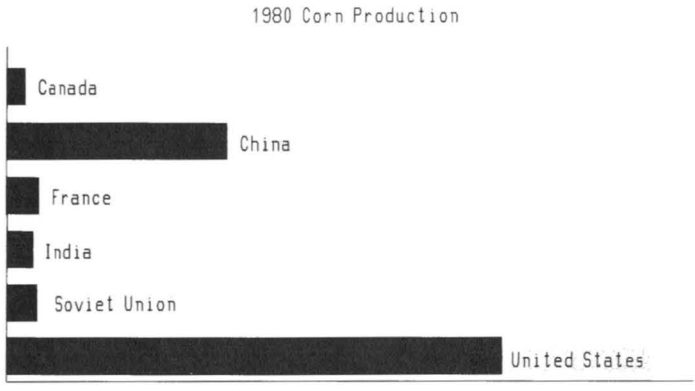
4. Press the RETURN key.

If you chose *Yes* in the "series/point label" field, and there is more than one series in the chart, each series will be labeled with its series name. The label appears near the last data point in the series. If there is only one series, each data point will be labeled with its category.

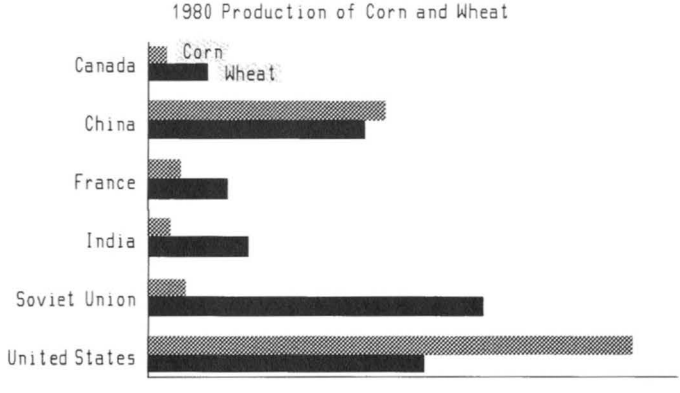
If you chose *Yes* in the "value label" field, each data point in each series will be labeled with its value.

You can change the appearance of series/point and value labels, including number format and date format, with the Format Value or Format Category commands on the List or Entry menus (see "Formatting Data Points" in Chapter 5 for details). You can change the text by editing it with the Alpha command on the Chart menu. If you edit a label, its text becomes set.

You can format series/point and value labels with the Format Color, Format Pattern, Format Size, Format Type, and Format Weight commands, just as you would any other dependent label. If you select a series/point or value label, you will format that label alone. To format all of the series/point labels or all of the value labels at once, select the master series/point label or master value label.

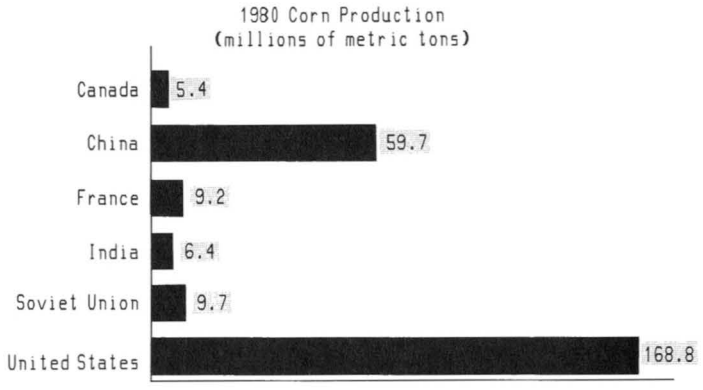


Series/point Labels for a Chart With One Series

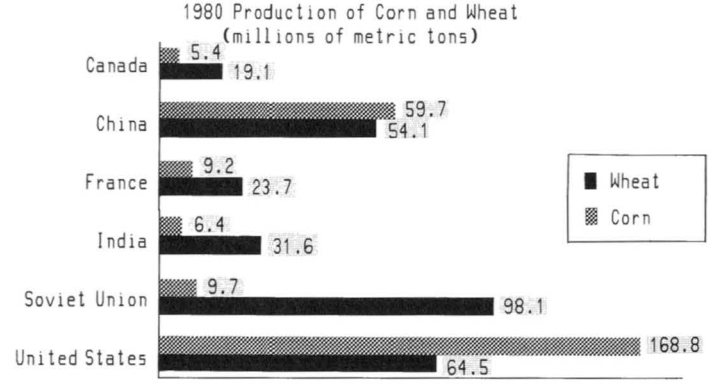


Series/point Labels for a Chart With More Than One Series

Figure 6.16. Series/point Labels



Value Labels for a Chart With One Series



Value Labels for a Chart With More Than One Series

Figure 6.17. Value Labels

Fonts

You can change the font and the font size of the text in labels, legends, or tick mark labels by selecting the label or legend and choosing the Format Type command.

1. Select the label or legend.

2. Choose the Format Type command.

3. In the "font" field, use the direction keys to choose a font from the list of available fonts.

4. In the "size" field, use the direction keys to choose a font size from the list of available point sizes, or type a point size.

   One point is 1/72 inch. The point size for the type in this book is 10 point. The maximum point size you can specify is 127.

5. Press the RETURN key.

See Appendix A, "Fonts," for more information on the use of fonts.

Arrows

An arrow is part of the label from which it originates. Every label has an arrow, though the arrow is at first invisible.

The tail of the arrow is attached to the label. The head of the arrow may be attached to another object, or it may point to a fixed position on the screen. If the head of the arrow is attached to another object, the arrow will point to the object regardless of how the position of the object changes.

Drawing Arrows

To draw an arrow and make the head point to an absolute position on the screen:

1. Select the label from which the arrow will originate.
2. Choose the Format Arrow command.
3. Choose *Free* in the "points to" field.
4. In the "position" field, use the direction keys to move the selection arrow to the place you want the arrow to point to.
5. Press the RETURN key.

When you execute the Format Arrow command, the pattern of the arrow becomes Solid. You can make the arrow invisible again by changing the pattern of the arrow to Clear.

To draw an arrow and make the head point to a particular object, regardless of how the position of the object changes:

1. Select the label from which the arrow originates.
2. Choose the Format Arrow command.
3. In the "points to" field, choose which type of object you want the arrow to point to: category axis, series/point, title, or value axis.
4. If you chose *Series/point* in the "points to" field, move to the "series,point number" field and type the number of the series or the number of the series followed by a comma and the number of the point.

   If you type the number of the series alone, the arrow will point to the last data point in the series.
5. Press the RETURN key.

To move the tail of the arrow, use the Move command to move the label from which the arrow originates.

Formatting Arrows

You can control the pattern, color, and weight of an arrow by selecting the label from which it originates and using the Format Pattern, Format Color, and Format Weight commands, respectively. See "Changing Pattern, Color, and Line Weight" in this chapter.

To format the shape and size of an arrow, and the distance between the head of the arrow and the object it points to:

1. Select the label from which the arrow originates.
2. Choose the Format Arrow command.
3. Choose *Narrow*, *Medium*, or *Wide* in the "head" field.
4. Choose *Yes* or *No* in the "open" field.
5. Choose *Off*, *Short*, *Medium*, or *Long* in the "head size" field. *Off* means no arrow head at all.
6. In the "distance" field, type a measurement in inches or centimeters for the distance between the head of the arrow and the object it points to.

   If the response in the "points to" fields is *Free*, the response in the "distance" field is ignored.
7. Press the RETURN key.

Adding Floating Arrows

To add a "floating" arrow that does not appear to originate from a label:

1. Choose the Insert New-label command.

2. Without typing anything in the text field, press the RETURN key.

   Chart inserts a free label in the upper left corner of the plot area and selects it. Because it has no text and the pattern of all its parts is Clear, it is invisible.

3. Choose the Format Arrow command.

4. Proceed as described above to position and format the arrow.

Legends

When you first create a chart with more than one series, Chart automatically inserts a legend. You can also have a legend in a chart with only one series. When there is more than one series, there is an entry in the legend for each series. The entry contains an indication of the pattern or color corresponding to each series and the series name. When there is only one series in a chart, there is an entry in the legend for each data point.

As with all objects with frames, you can control the absolute position and size of the legend with the Move and Format Size commands, and the color, pattern, and line weight of the frame and plot area with the Format Color, Format Pattern, and Format Weight commands, respectively. See "Changing Color, Pattern, and Line Weight" and "Moving Objects and Changing Size" in this chapter for details.

Deleting and Inserting Legends

You can delete and insert legends with the Delete and Insert Legend commands. See "Removing Objects and Putting Them Back" in this chapter.

When you delete a legend, Chart uses the space normally reserved for the legend to make the plot area larger when it redraws the chart, unless you have set the size of the plot area with the Format Size command. When you insert a legend, Chart makes the plot area smaller, to allow room for the legend.

Chart remembers the format of a deleted legend. If you reinsert a legend with the Insert Legend command, it will have the same format it did before you deleted it.

When you delete or insert a legend, the response in the "show legend" field in the Format Type command for the legend becomes *Set*, indicating that you control whether or not there is a legend. If you want Chart to resume control of the legend, choose *Auto* in the "show legend" field.

Controlling Legend Position and Layout

By changing its type, you can control the general position and layout of the legend without using the Move or Format Size commands. In the Format Type command, you can specify one of four general locations and layouts for legends:

Type	Layout and Location
Bottom	Horizontal legend at bottom of chart
Corner	Vertical legend at upper right corner of chart
Top	Horizontal legend at top of chart
Vertical	Vertical legend at center of right side of chart

If you change the legend type, Chart will change both the position and size of the legend, unless you have set either of these with the Move or Format Size commands. For example, if you have a vertical legend whose size is set, and you change it to a top legend, Chart will move the legend to the top, because the position of the legend is still automatically controlled. But it will not change the layout of the legend from vertical to horizontal, because the size of the legend is set.

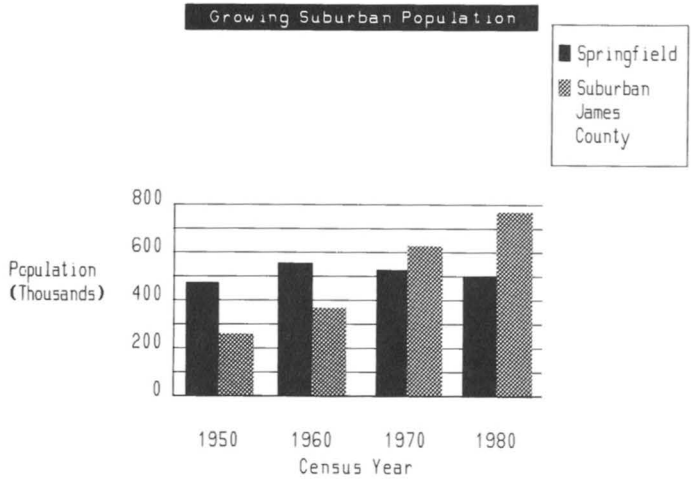
To change legend type:

1. Use the direction keys to select the legend.

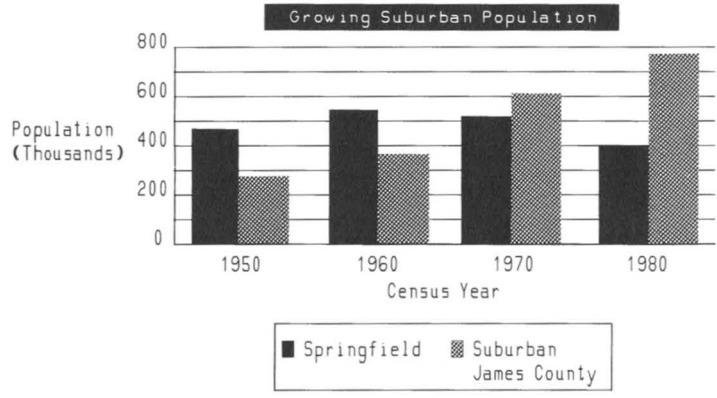
2. Choose the Format Type command.

3. Choose *Bottom*, *Corner*, *Top*, or *Vertical* in the "type" field.

4. Press the RETURN key.

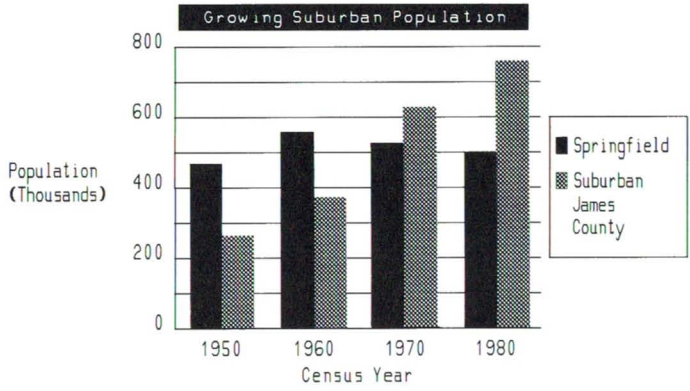


Corner Legend

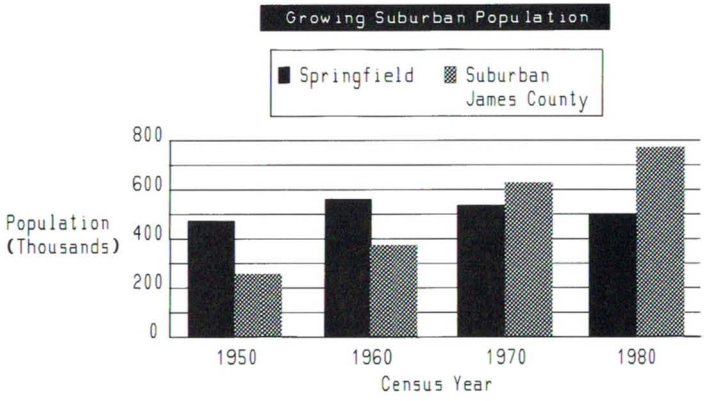


Bottom Legend

Figure 6.18. Legend Types



Vertical Legend



Top Legend

Figure 6.18 (Continued). Legend Types

Chapter 7

Working With More Than One Chart

Inserting, Arranging, and Deleting Charts 204

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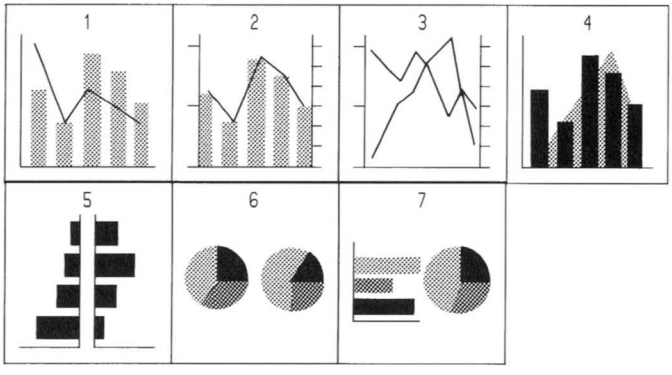
Overlaid Charts 212

Chart allows you to create and display up to 16 different charts together on the screen or on a single page. Each chart can be positioned anywhere on the screen or page. Two or more charts may be overlaid to create a mixed chart form, such as a combination line-column chart. You can change the format of each chart individually, or, with the Format Link command, you can specify that two or more charts share certain format elements.

By combining charts, you can communicate complicated messages. You can use the mixed gallery to create some of the more common multiple chart forms automatically (see diagram below and the Gallery Mixed command in Chapter 9, "Command Directory") or you can use the Format, Insert, Move, and Split commands to combine charts however you want.

In the mixed gallery, charts 1 through 4 are overlaid charts. Charts 5 through 7 provide two charts in a side-by-side arrangement. When you choose the side-by-side charts, Chart divides the screen to show both charts.

Charts 1-4 are overlaid charts.



Charts 5-7 are side-by-side charts.

This chapter describes how to create multiple charts without using the Gallery. The first part describes how to create and work with charts that occupy different positions on the screen. The second part describes the special case of overlaid charts, that is, charts that occupy the same position.

Inserting, Arranging, and Deleting Charts

Use the Split command to control the overall arrangement of the chart screen by dividing it into rows and columns. Each rectangle defined by the rows and columns is called a box. When you create a new chart with the Insert Chart New command, Chart will automatically assign the correct position and size to the chart so that it fits into the box you specify. You may have as many as 4 rows and 4 columns, that is 16 boxes, at one time. The boxes are numbered from left to right and top to bottom starting with box 1 in the upper left corner of the screen.

If you have a single chart on the screen and want to add more charts, use the Split command to divide the screen into as many boxes as you need. Then use the Insert Chart New command to insert the additional charts, placing each one in a separate box.

The following procedure shows how to add a new chart to a screen that contains a single chart. The new arrangement will be two charts displayed side by side:

1. Choose the Split command.

2. Type *2* in the "# of columns" field.

3. Choose *Yes* in the "show borders" field if you want Chart to draw borders around the boxes and show the number of each box.

4. Press the RETURN key.

   The screen has been divided into two boxes, and the original chart is now in the box on the left. To insert the second chart:

5. Choose the Insert Chart New command.

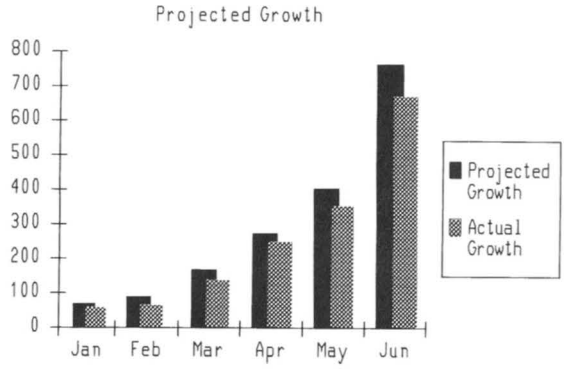
   The proposed response in the "in box #" field is *2*. Since you will insert the new chart in box 2, the proposed response is acceptable.

6. Press the RETURN key.

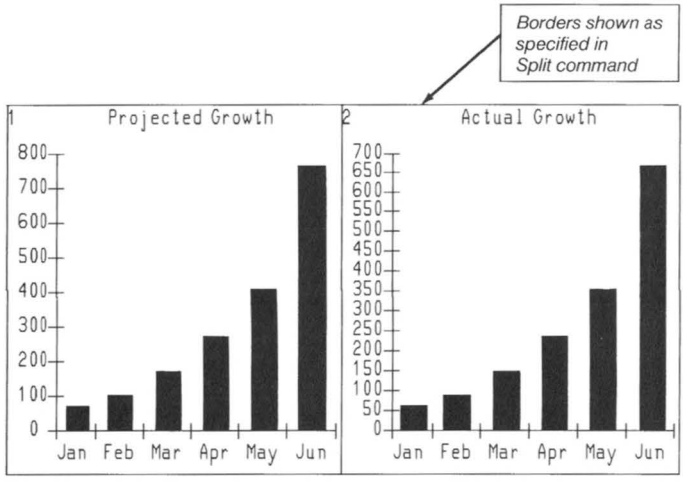
Now there are two charts displayed side by side on the screen. The new chart is a clustered column chart, which is the default chart type. The data series that were included in the original chart have been distributed between the two charts. For an explanation of how the series are distributed and how to change the distribution, see the next section, "Data Series Distribution."

You can format each chart just as you would a single chart. To select a chart, use the NEXT CHART and PREVIOUS CHART keys. When you have selected the chart you want, use the direction keys to select and format objects within the chart as described in Chapter 6, "Making and Revising Charts." When there is more than one chart, the selection indicator displays the number of the chart that contains the selected object. For example, if the category axis in the second chart is selected, the selection indicator displays "Chart 2:Axis Category." When an entire chart is selected, the selection arrow points to the lower left corner of the selected chart. Choosing a chart type from the Gallery applies only to the selected chart.

Whenever you change the arrangement of boxes on the chart screen with the Split command, the charts will be positioned and sized automatically to fit the new boxes, unless you have set their positions and sizes. If you specify an arrangement with fewer boxes than charts, no charts will be deleted, but some charts will not be displayed. The normal arrangement of the chart screen is one row and one column. You can always return to this arrangement by using the Split command to specify one row and one column.



Before Splitting the Screen



After Splitting Screen and Adding New Chart

Figure 7.1. Adding a New Chart

You can move a chart to any position on the screen by selecting the entire chart and using the Move command. Another way to move the chart is to use the Split command to specify a different box number for the selected chart in the "current chart in box #" field. This is a quick way to align a chart with charts in other boxes or to create overlaid charts, which are described in "Overlaid Charts" later in this chapter.

You can delete and reinsert charts with the Delete and Insert Scrap Chart commands, described under "Removing Objects and Putting Them Back" in Chapter 6. You can insert new charts with the Insert Chart New command and with the Insert Chart Overlay command, which is described in "Overlaid Charts" later in this chapter. When you delete a chart, the other charts are renumbered as necessary. When you insert a new chart or reinsert a deleted chart, it is assigned the highest chart number.

Every chart is associated with a box, but the chart's size and position is not restricted to the size and position of the box. You can change the size of a chart to be any size up to the full display area and the position to anywhere on the display area, completely ignoring the boxes if you choose. You can have two charts side by side, or any arrangement of multiple charts within a single box. You insert the charts into the same box and then position and size them. The position and size of a chart is restricted to the display area; the position and size of any object within a chart is restricted to the boundaries of its chart.

Data Series Distribution

Chart normally distributes all included data series in the order in which they appear in the List. Chart distributes the data series as evenly as possible among the charts on the screen in the order of their chart numbers. For example, if there are two charts and two series, the first series in the List will appear in chart 1, the second in chart 2. If there are three series, the first two will appear in chart 1 and the third in chart 2.

Chart will redistribute the series among the charts if:

- The number of charts or the ordering of charts changes
- The number of included series or the ordering of series changes
- Any of the charts is changed to a pie chart, which never contains more than one series

You can manually control the distribution of the series, putting any series into any chart, or even the same series into several charts, by using the Format Type command with the entire chart selected. The "series" field of this command lists the numbers of the data series in the selected chart. By editing this list, you can control both the series numbers and the order of the series in the chart.

To specify which data series appear in a chart:

1. Use the NEXT CHART and PREVIOUS CHART keys to select the chart.
2. Choose the Format Type command.
3. Type a list of series numbers, separated by commas, in the "series" field. Each number represents a series number as shown on the List screen. The series will appear in the chart in the order in which you type them, regardless of their order in the List.

   For example, if you want series numbers 3 and 2 from the List to be the first and second series in a specific chart, you select the chart and then enter *3,2* in the "series" field of the Format Type command.
4. Press the RETURN key.

The specified series will appear in the chart even if they are marked for exclusion (-) in the List. Changing the "series" field causes the accompanying Auto-Set field to change to *Set*. The remaining included (*) series not listed in the "series" field will be distributed among the remaining charts with "series" fields still automatically controlled by Chart.

Linking Charts

With the Format Link command, you can specify that two or more charts share certain format elements. The following elements can be shared:

- The height and width of the plot area
- The range of the value axis
- The number of categories on the category axis

For example, if you created three charts in three boxes, you may want all the charts to have the same size plot areas. You can link the plot area size of charts 2 and 3 to chart 1 so that all three charts will have the same size plot area even when you change the plot area size of chart 1. Thus, you can achieve a uniform look among several charts without having to specify the format of each chart individually.

The Format Link command establishes a link between two charts. One of the charts is the "linked" chart and the other is the "master" chart. There may be several charts linked to a single master chart.

The linked chart acquires the linked format elements from the master; if you change a linked format element in the master chart, the same element in the linked chart will change automatically. If you change a format element in the linked chart, the master chart will not change. That format element in the linked chart will be set, and the linked chart will no longer acquire that element from the master chart. However, the charts will still be linked in the Format Link command, and you can make the linked chart acquire the master chart format element again by changing the Auto-Set field for the linked element back to *Auto*.

When value axes are linked, the range is the same. All the data for both charts is considered when the range is determined. When category axes are linked, they have the same number of categories. Chart determines the number of categories to accommodate the categories of all the data series in all the linked charts.

To link one chart to another:

1. Use the NEXT CHART and PREVIOUS CHART keys to select the chart that will be linked to the master chart.

2. Choose the Format Link command.

3. In the "current chart to chart #" field, type the number of the master chart.

4. Choose *Yes* in the "link height", "width", "link value axis", or "category axis" fields to link those elements of the charts' formats.

5. Press the RETURN key.

You can also use the Format Link command to check the link status or to remove the link from the selected chart. A response of *0* in the "current chart to chart #" field, indicates the current chart is not a linked chart, though it could be a master chart.

To remove the link between two charts:

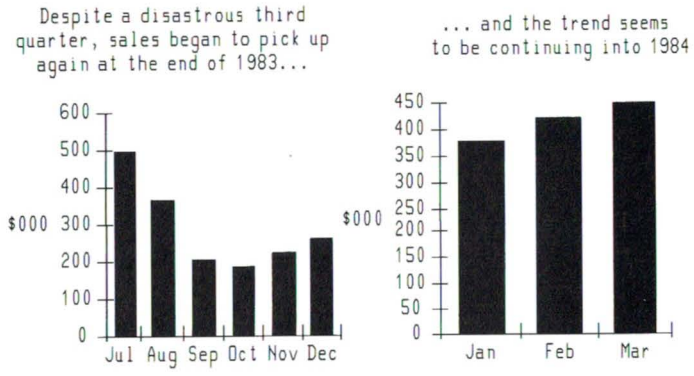
1. Use the NEXT CHART and PREVIOUS CHART keys to select the linked chart.

2. Choose the Format Link command.

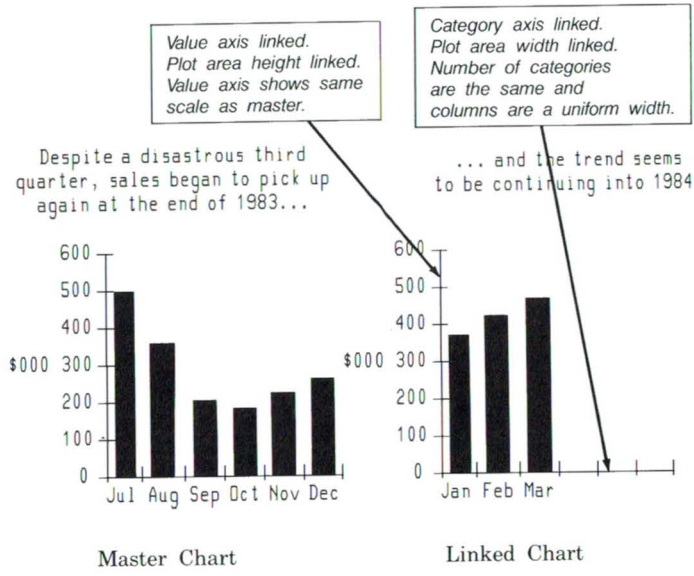
3. Type *0* in the "current chart to chart #" field.

4. Press the RETURN key.

If you delete a linked chart or master chart, the links for that chart are broken. If you reinsert the chart from the scrap, it will not be linked.



Unlinked Charts



Linked Charts

Figure 7.2. Unlinked and Linked Charts

Overlaid Charts

Two charts are "overlaid" when they are linked and occupy the same box. They are overlaid because one is drawn on top of the other. The combination of the two charts is called an overlaid chart form. The chart that has the lower chart number is drawn first, so it is on the bottom, and the other chart is drawn on top.

Overlaid charts usually have linked plot area heights, plot area widths, and category axes, though the value axes may or may not be linked. Usually the chart on the bottom is the master chart and the chart on top is the linked chart. The "overlay" chart is the linked chart, regardless of which chart is drawn first.

In the overlay chart, axis labels, the title, and the legend are not drawn. Chart will not allow you to add a legend to the overlay chart. The legend of the master chart will indicate the data series of both charts. The axis labels, title, and legend that appear can be selected only when the master chart is the selected chart. If the axes of the overlay chart are linked to the master, they are drawn only if they do not coincide with the master chart's axes.

In the mixed gallery, charts 1 through 4 are overlaid charts. Each chart has linked plot area heights, plot area widths, and category axes. Charts 1 and 4 have linked value axes; charts 2 and 3 do not.

To create an overlay chart on top of an existing chart:

1. Use the NEXT CHART and PREVIOUS CHART keys to select the chart that will be the master chart.

2. Choose the Insert Chart Overlay command.

   Chart places a new chart in the same box as, that is, on top of, the originally selected chart, and selects the new chart. The new chart is the overlay chart. It is linked to the original chart; all four format elements that can be linked are linked. Each chart can be selected and formatted in the normal manner.

If you have two separate charts that you want to merge into an overlaid chart form, do the following:

1. Use the NEXT CHART and PREVIOUS CHART keys to select the chart that will become the overlay chart.

2. Choose the Split command.

3. In the "current chart in box #" field, type the box number of the chart that will be the master chart.

4. Press the RETURN key.

5. Choose the Format Link command.

6. In the "current chart to chart #" field, type the chart number of the chart that will be the master chart.

Note

Take care not to confuse the chart number with the box number that the chart currently occupies.

---

7. Choose the desired options in the other fields of the Format Link command.

8. Press the RETURN key.

A common type of overlaid chart involves the comparison of two related series of data that are not measured in the same units. For example, you may want to compare the production of a certain grain, measured in thousands of bushels, with the wholesale price of that grain, measured in dollars per bushel, in each month of the year. The data could be compared with two separate charts, but it is often more effective to compare them in the same chart. This requires an overlaid chart form with the same plot area and category axis, but with two value axes with different ranges, located at opposite ends of the category axis.

To create this chart form, first create an overlaid chart using one of the methods described above. Then:

1. Use the direction keys to select the category axis of the overlay chart.

2. Choose the Range command.

3. Choose *Yes* in the "maximum" field, and press the RETURN key.

4. Use the direction keys to select the value axis of the overlay chart.

5. Choose the Format Type command.

6. Choose *Axis* in the "labels for tick marks" field, and press the RETURN key.

7. Choose the Format Link command.

8. Choose *No* in the "link value axis" field, and then press the RETURN key.

Note

In an overlaid chart, make sure that the chart on top has the Clear pattern specified for the backgrounds of the chart and of the plot area. Otherwise, the chart on the bottom will be obscured.

Chapter 8
Saving and Printing Charts

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Chart Screen Display

The charts you make can be displayed on your computer screen, or on a variety of printers and plotters. Chart takes advantage of the capabilities of the device you use, so your chart may appear somewhat different if you switch from one printer or plotter to another one. Since the screen's capabilities are different from those of a printer or plotter, a chart displayed on the screen will not look exactly like the same chart printed.

A chart can be displayed on the screen in two ways, depending on your response in the "display" field of the Options command:

- If your response is *Screen*, the chart is designed specifically for your computer screen and will look best when displayed on the screen.

- If your response is *Device*, the chart you see on your screen is the best representation possible of how the chart will look when you print it on the device specified in the "device" field of the Print Setup command.

These command fields are shown below. The following pages tell you how to best make use of these fields and of your printer or plotter.

The "display" field of the Options command:

```
OPTIONS redraw chart:Yes No  display:Screen Device
        invert screen:Yes No  mute:Yes No  unit:Cm Inch
```

The "device" field of the Print Setup command:

```
PRINT SETUP device:                adapter:
```

Screen, Printer, and Plotter Differences

Screens, printers, and plotters differ in four ways:

1. Features available. These include fonts, colors, area patterns, line patterns, and markers for line and scatter charts.

2. Resolution. For plotters, this is the smallest possible movement in each direction. For the screen and printers, this is the size of a single dot.

3. Dimensions and shape of the display area. The dimensions are the height and width. The shape is the ratio of the display area's height to its width.

4. Font sizes available.

Features

In fields that control colors, patterns, marker types, and fonts, both the automatic settings and the lists of choices you can view with the direction keys are based on the available features of the device you specify in the "device" field of the Print Setup command.

For example, suppose you are using a monochrome screen and intend to print your chart on a plotter that has four colors. The screen cannot display the colors, but if you specify the plotter name in the "device" field of the Print Setup command, Chart lists each object's color in the command fields of the Format Color command. With the direction keys, you can view a list of all colors available on the plotter. If the device specified in the "device" field is a black-and-white printer, the Format Color command fields display only the color Black.

You can always request a feature that is not available on a device. If a chart calls for a feature that is not available on your screen, printer, or plotter, Chart temporarily substitutes the closest available feature. A chart can, therefore, be drawn on any device, regardless of how many or how few features the device may have. For example, if you type *Red* in a color field and red is not available, Chart uses the color closest to red.

Resolution

Because printers and plotters have higher resolution than the screen, charts will look better when printed than they do on the screen. For example, curved and diagonal lines will be smoother, and text will be sharper.

Dimensions

The positions and sizes of chart objects displayed on the screen are determined by your response in the "display" field of the Options command. The positions and sizes of objects in the printed chart are determined by the display area specified in the Print Options command (Chart menu). The printed chart always fills the entire display area.

If your response in the "display" field is *Screen*, the displayed chart takes up the full screen. If you have a standard 12-inch monitor, all positions and sizes given in the Format Size, Format Type, and Move commands will be accurate.

If your response in the "display" field is *Device*, then the chart displayed on the screen will have the same shape as that of the display area specified in the Print Options command. All positions and sizes given in the Format Size, Format Type, and Move commands will be accurate for the display area. If you leave the display area fields on *Auto*, the displayed chart will take up the full screen. If you set the display area to another shape, the chart will fill only one dimension of the screen (that is, either the height or the width, but not both).

Font Sizes

The text font size affects the position and size of the frame containing it. It also affects the positions and sizes of nearby objects in the chart. Fonts available for display on the screen generally do not have the same widths and heights as those available on the device in the "device" field of the Print Setup command.

If your response is *Screen* in the "display" field of the Options command, Chart sizes and positions text frames and nearby objects according to the size of the fonts available on the screen.

If your response in the "display" field is *Device*, Chart sizes and positions text frames and nearby objects according to the size of the fonts available on the device you specify in the "device" field. These are the font sizes that Chart will use to print the chart.

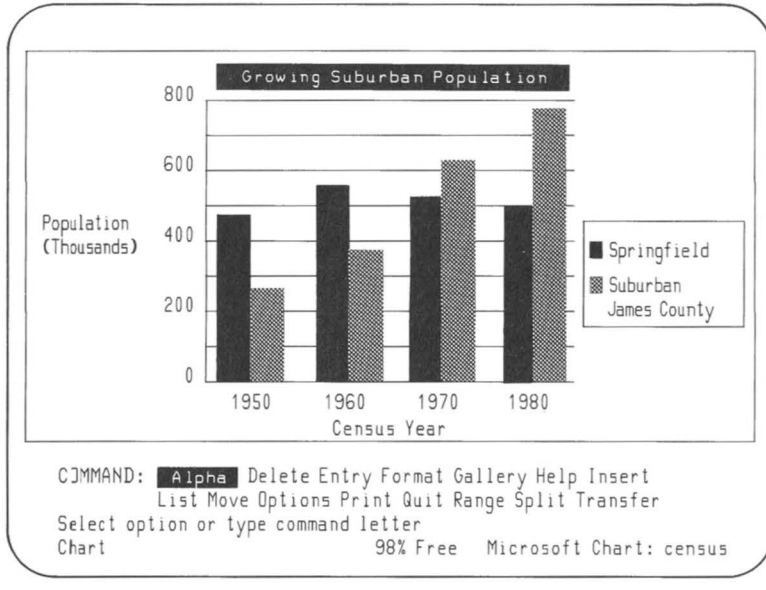

Figure 8.1. "Display" Field Response is Screen

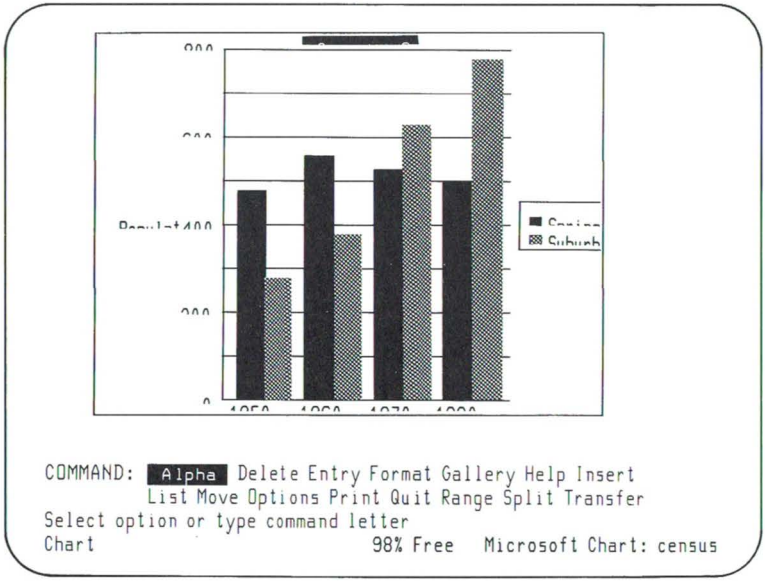
COMMAND: Alpha Delete Entry Format Gallery Help Insert
List Move Options Print Quit Range Split Transfer
Select option or type command letter
Chart
98% Free
Microsoft Chart: census

Figure 8.2. "Display" Field Response is Device

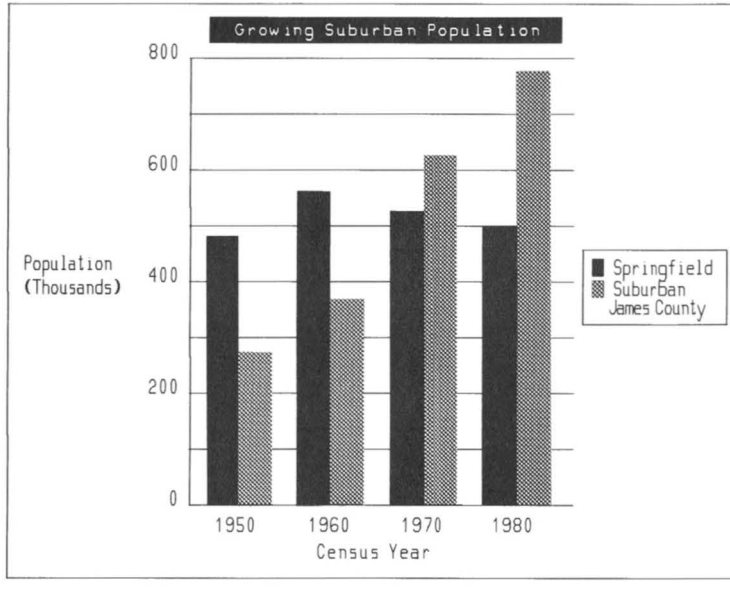

Figure 8.3. The Printed Chart

When to Change the Display Field

The advantage of having *Device* as the response in the "display" field is that the positions and sizes of objects on the screen will be in exact proportion to the printed chart. The corresponding measurements in the command fields will be exact for the printed chart. The disadvantage is that font sizes on the screen are usually larger than the font size that Chart uses when printing. Therefore, text displayed on the screen will be too large for the text frames, and will be "clipped" at the edges of the frames. The text will not be clipped when printed.

The advantage of having *Screen* as the response in the "display" field is that text will not be clipped and the full screen will be used to display the chart. The disadvantage is that positions and sizes will not correspond exactly to the printed chart.

If you need precise positioning and sizing, you should specify *Device* in the "display" field. If you are more interested in having your chart look good on the screen than in seeing exact positions and sizes, you should choose *Screen*. Choosing *Screen* in the "display" field will not affect the printed chart, which will always look good when printed on the device you specify in the "device" field.

When to Change the Device Field

If you are interested only in displaying the chart on the screen and not in printing it, then the response in the "display" field of the Options command should be *Screen*.

If you intend to print the chart, you should specify your printer or plotter in the "device" field of the Print Setup command before you create the chart. This allows Chart to show the features of your device in the fields of the Format commands.

Saving Charts and Data

To save a chart on disk:

1. Choose the Transfer Save command.
2. Type a filename in the "filename" field.
3. Choose *Symbolic* in the "mode" field if you want to save the file in SYLK format.
4. Press the RETURN key.

Chart saves all the data series in the List and the chart format in the specified file. When you load the file with the Transfer Load command, you can specify that you want to load the entire file, just the data, or just the chart format.

Changing the Default Data Drive

Unless you specify otherwise, Chart assumes that any filename you enter refers to a file on the default data drive or directory. The initial default data drive or directory is the one from which you start Chart. To specify a file in another drive, include the name of the drive before the filename. For example, to save the file ENERGY.SLK on drive B, you would type *b:energy.slk* in the "filename" field above. See "Operating Information" for more information about data drives and directories.

You can also change the default data drive with the Transfer Options command:

1. Choose the Transfer Options command.

2. In the "setup" field, enter the name of the drive or directory where you want Chart to look for or save files.

   For example, if you want to change the default data drive to drive B, type *b:* If you want to change it to the directory FRED\CHARTS on drive C, type *c:\fred\charts*

3. Press the RETURN key.

You can also use the Transfer Options command to view the current setting of the default data drive. When you choose the Transfer Options command, the current default data drive is displayed in the "setup" field. If you don't want to change it, press the CANCEL key.

Printing

With the Print commands, you can print the chart, the List of data series, or the contents of a data series, as displayed on the Entry screen. To print the chart, you must be on the Chart screen. To print the List, you must be on the List screen. To print the contents of a data series, you must have the data series displayed on the Entry screen. Once you are on the proper screen, the procedure for printing is essentially the same.

If you press CANCEL, Chart pauses and displays the message "Enter Y to continue." Pressing CANCEL again cancels printing and returns you to the main command menu from which you gave the Print command.

Printing Data

To print the List or the contents of a data series, first use the Print Setup command to specify the parallel or serial adapter to which the printer is attached.

- To print, choose the Print Printer command.
- To print to a file, use the Print File command instead of the Print Printer command.

See the Print commands in Chapter 9, "Command Directory," for details.

Printing Charts

To print the chart, first use the Print Setup command to specify the printer or plotter on which you will be printing and the name of the parallel or serial adapter to which the device is attached. You may also set options that control the size, position, orientation, and printing of the chart. See the Print Options command in chapter 9, "Command Directory," for details.

- To print, choose the Print Printer command.

  You should specify your printer or plotter in the "device" field of the Print Setup command before you create the chart. Then Chart can show you the available features for your device; automatic settings and the lists of available features are based on the capabilities of your printer or plotter.

- To print to a file, use the Print File command instead of the Print Printer command. See the Print commands in Chapter 9, "Command Directory," for details.

Using Plotters

Plotters have one or more pen colors mounted at one time. When you print to a plotter, Chart displays the following message before starting to print:

```
Enter Y after mounting (color names)
```

The list of color names are the pen colors that should be mounted on the plotter in the order shown. If more colors are needed to complete the chart, the message will be repeated. To minimize the number of pen changes, Chart uses each color only once.

Chart assumes that you are using the pen colors that are normally available with the plotter. If you want to use other pen colors, substitute them for the requested color when Chart prompts for a pen change.

If your plotter holds four or more pens, a chart with automatic color settings will not require manual pen changes. You will have to change pens only if you use the Format Color command to request more colors than your plotter can hold at once. If your plotter holds fewer than four pens, automatic color settings may require manual pen changes, depending on the complexity of your chart.

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Reference to Chart

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Chapter 9
Command Directory

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Alpha

Entry menu

ALPHA/VALUE:

Chart menu

ALPHA:

Purpose

To enter and edit text or numbers in the category and value columns on the Entry screen and in labels on the Chart screen.

Remarks

If you have set the size of a label with the Format Size command from the Chart menu, any words or parts of words that do not fit in the label will not appear.

When the main command menu on the Entry screen is showing and you type any numeral, a plus sign (+), a minus sign (-), a decimal point (.), a double quotation mark ("), or an equal sign (=), Chart assumes you want to enter a value and goes to the Alpha command.

After you type or edit the response, you can enter it into the category or value by pressing either the RETURN key or any of the direction keys (RIGHT, LEFT, UP, DOWN). The RETURN key places what you typed into the selected category or value and returns you to the main menu. The direction keys place what you typed into the selected category or value, select the next or previous category or value, and continue in the Alpha command so you can enter more information.

If the message asks for text, enter any combination of letters, numbers, punctuation, and special symbols. In labels, the text may be more than one line long. To enter a line break, press the NEWLINE key. If you do not enter line breaks with the NEWLINE key, Chart breaks the lines for you.

If the message asks for a value, enter a number. You can use the percent sign (%), the plus sign (+), the minus sign (-), the decimal point (.), and E in scientific notation; see "Entering Data from the Entry Screen" in Chapter 5. Do not use commas or any other non-numeric characters.

Analyze

List menu

```
ANALYZE: Average Cumulative Difference Growth Math
         Percent Statistics Trend
```

Purpose

To perform various calculations on the selected series.

Remarks

The following applies to each of the Analyze commands except Analyze Math. See the "Remarks" section under Analyze Math for details about how the command differs from the others on the Analyze menu.

The calculated series has the same categories and number of data points as the original series (unless the series was calculated with Analyse Statistics). See the examples on the following pages.

The calculated series is permanently linked to the original series. If you change the original series, the new series is recalculated. To unlink the two series, use the Modify Copy command to make a copy of the calculated series, then delete the calculated series. The copy is not linked to the original.

Chart automatically names the calculated series. The name reflects 1) the command used to create the series and 2) the name of the series the new series was calculated from (for example, "Percentages of Census"). Chart positions the new series in the List directly below the series it was calculated from.

The formulas for calculating a series are explained on the following pages.

Analyze Average

List menu

```
ANALYZE AVERAGE using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

The sum of the values in the selected series is divided by the number of data points. The result is placed in the value column for each data point in the new series.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Average of Original Series	
Jenkins	6	Jenkins	4
Godfrey	5	Godfrey	4
Simms	3	Simms	4
Boyle	2	Boyle	4

Analyze Cumulative

List menu

```
ANALYZE CUMULATIVE using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

The new series has the same categories as the original series. The first value of the new series is the same as the first value of the original series. The second value of the new series is the sum of the first and second values of the original series. The third value in the new series is the sum of the first, second, and third of the original series, and so on.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Cumulative of Original Series	
January	10	January	10
February	10	February	20
March	10	March	30
April	10	April	40

Analyze Difference

List menu

```
ANALYZE DIFFERENCE using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

The first value of the new series is the same as the first value of the original series. The second value is the difference between the second and first values of the original series; the third, the difference between the third and the second; and so on. The categories in the new series are the same as those in the original series.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Differences of Original Series		
1980	5	1980	5	
1981	2	1981	-3	(2 minus 5)
1982	13	1982	11	(13 minus 2)
1983	34	1983	21	(34 minus 13)

Analyze Growth

List menu

```
ANALYZE GROWTH using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

The new series is a sequence of values that forms an approximation of a smooth curved line when viewed on the chart screen as a line chart. The growth line gives an indication of how the data in the original series is changing. This function is sometimes called a smoothing function because it tends to show a smooth increase or decrease even when the data seems to change drastically. This function is best used with a Date series to indicate a general tendency of the data to increase or decrease over a period of time.

The growth line is calculated by an exponential curve-fit formula that uses a least-squares approximation method. First, the natural logarithm of the original series is calculated. Then the trend is calculated and the new series is formed by taking the antilog of the trend. For the trend formulas, see the Analyze Trend command.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Growth of Original Series	
1	1	1	1.25
2	3	2	2.35
3	5	3	4.45
4	8	4	8.40
5	14	5	15.87
6	31	6	29.97

(Values shown in Fixed format with two decimal places.)

Analyze Math

List menu

```
ANALYZE MATH using series:                    and series:
                operation: + - * /
```

Purpose

To calculate values for a new series based on the values of the two selected series.

Remarks

The two series used in an arithmetic operation can have a different number of data points. If, for example, you add one series containing ten values to another series containing seven values, the last three values of the first series are copied over to the calculated series. If you do not want these values in the calculated series, use the Modify Delete command to remove them.

The two series do not have to be of the same type. You can, for example, add the values of a Text series to those of a Sequence series. Chart makes the calculated series the same type as the larger of the two series used in the arithmetic operation. If both of these series have the same number of data points, Chart makes the calculated series the same type as the one you entered in the "using series" field.

If both series are Number series, Chart performs the specified arithmetic operation on the series categories, as well as on their values. The following shows the addition of two Number series:

Series 1		+	Series 2		=	New Series	
Categories	Values		Categories	Values		Categories	Values
2	12		1	9		3	21
4	14		3	11		7	25
6	16		5	13		11	29
10	18		7	15		17	33

A calculated series is not linked to either of the series you used to create it. You can edit the calculated series without affecting either of the original series.

As with the series created by the other Analyze commands, Chart automatically names any series created with Analyze Math. The name reflects 1) the operation used to create the new series and 2) the numbers of the series used to create the calculated series. For example, a calculated series representing the sum of series 1 and 2 in the List would be named "Addition of (1, 2)."

Because a calculated series is the product of two existing series, Chart positions the new series in the List directly below the original series with the highest number.

If, in either of the original series, you've entered an asterisk (*) to indicate a non-available value, an asterisk will also appear as the corresponding value in the calculated series.

Command Fields

using series:

Enter the line number of the first series used in the arithmetic operation you want to perform. Either type the number or use the direction keys to highlight the line.

and series:

Enter the line number of the second series used in the arithmetic operation you want to perform. Either type the number or use the direction keys to highlight the line.

operation:

Choose the symbol of the arithmetic operation you want to perform. Symbols have the following meanings:

+ Values of the series in the "using series" and "and series" fields are added together.

– Values of the series in the "and series" field are subtracted from the values of the series in the "using series" field.

* Values of the series in the "using series" and "and series" fields are multiplied by one another.

/ Values of the series in the "using series" field are divided by the values in the "and series" field.

Example

In the following example, sales figures for Product A are added to those for Product B to produce a third series showing total sales:

Product A	Product B	Total Sales
$9000	$11000	$20000
$10000	$12000	$22000
$12000	$14000	$26000
$15000	$17000	$32000

Analyze Percent

List menu

```
ANALYZE PERCENT using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

Each value in the new series is the original value's percentage of the sum of the original series. The new values may appear not to add up to 100 percent; this is a result of rounding necessary to display values in the format specified in the Format Value command. The stored values, however, always add up to 100 percent. The categories of the new series are identical to the categories of the original series.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Percentages of Original Series	
1980	5	1980	11%
1981	2	1981	4%
1982	17	1982	36%
1983	23	1983	49%

Analyze Statistics

List menu

```
ANALYZE STATISTICS using series:
```

Purpose

To calculate statistics on a data series and put the results in another data series. The new series is not included in the chart.

Remarks

Seven different statistics are calculated:

# of points	The number of data points in the original series.
Maximum	The largest value in the original series.
Minimum	The smallest value in the original series.
Average	The sum of the values of the original series divided by the number of values. (Values are the same as those given by the Analyze Average command.)
Median	The median is the middle value of the original series, if there is an odd number of values, or just below the middle if there is an even number. To calculate the median, Chart first sorts the values in ascending order.

Std. Deviation	The standard deviation. See formula later in this section.
Corr. Coeff.	The correlation coefficient. See formula later in this section.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Statistic on Original Series	
1980	5	# of points	4
1981	2	Maximum	23
1982	17	Minimum	2
1983	23	Average	11.75
		Median	17
		Std. Deviation	9.91211380079995
		Corr. Coeff.	0.89868436493392

Formula for Standard Deviation

$$s = \sqrt{t}$$

where

$$t = \frac{n\Sigma y^2 - (\Sigma y)^2}{n(n-1)}$$

Formula for Correlation Coefficient

$$r = \frac{n\Sigma xy - \Sigma x\Sigma y}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)\,(n\Sigma y^2 - (\Sigma y)^2)}}$$

Analyze Trend

List menu

```
ANALYZE TREND using series:
```

Purpose

To calculate values for a new series based on the values of the selected series.

Remarks

The new series is a sequence of values that forms a straight line when viewed on the chart screen as a line chart. The trend line gives an indication of how the data in the original series is changing. This function is best used with a Date series to indicate a general tendency of the data to increase or decrease over a period of time.

The trend line is calculated by a least-squares approximation method that is sometimes known as a simple linear regression. In the formulas below, x and y are the values of the data points over the whole range of the series.

Command Fields

using series:

Enter the line number of the series you want to analyze. Either type the number or use the direction keys to highlight the line.

Example

Original Series		Trend of Original Series	
Jan	54.00	Jan	58.71
Feb	56.00	Feb	58.03
Mar	62.00	Mar	57.34
Apr	64.00	Apr	56.66
May	59.00	May	55.97
Jun	47.00	Jun	55.29

(Values shown in Fixed format with two decimal places.)

Formulas for Trend

$$y = mx + b$$

where m is the slope and b is the intersection of the trend line on the y axis

$$m = \frac{n\Sigma xy - \Sigma x\Sigma y}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{\Sigma y\Sigma x^2 - \Sigma x\Sigma xy}{n\ \Sigma x^2 - (\Sigma x)^2}$$

The new series is computed by using the resulting formula $y = mx + b$ for each x (category) of the analyzed series to produce the corresponding y (value) of the trend series.

Chart

List, Entry menus

```
COMMAND: Alpha Delete Entry Format Gallery Help Insert
         List Move Options Print Quit Range Split Transfer
```

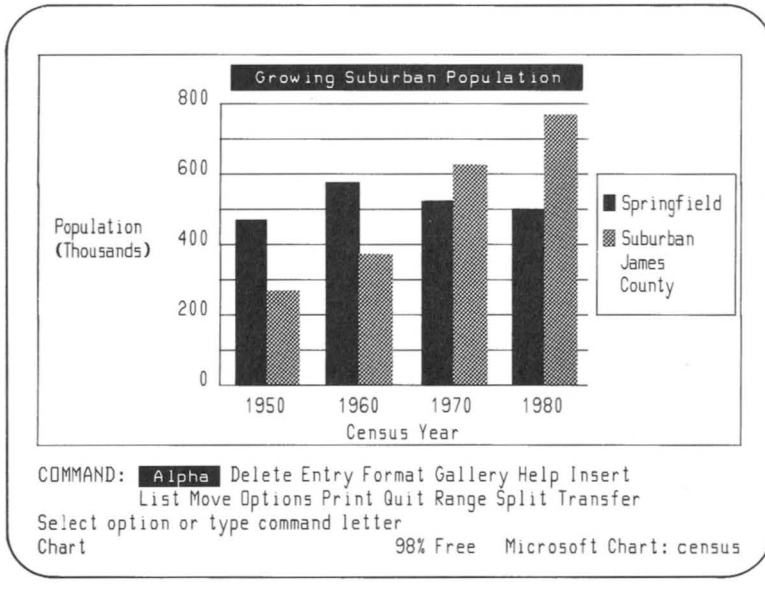
Purpose

To chart in the current format all the included data series on the List screen. Displays the Chart menu at the bottom of the screen.

Remarks

If there are no included series, displays a blank chart. This is useful for creating text-only charts for use in presentations. See "Creating Text-Only Charts" in Chapter 6 for more information on how to create text-only charts.

The Chart screen looks like this:



Delete

Chart menu

```
DELETE:
```

Purpose

To remove the selected object from the chart. If the object is a label or an individual chart, places it in the scrap.

Remarks

You must type *Y* to confirm this command. Pressing any other key cancels the command and returns you to the main menu.

If the selected object is a chart, it is removed from the display and put in the scrap. If there is already a chart in the scrap, the newly deleted chart replaces it. You cannot delete a chart if it is the only one on the screen.

If the selected object is a label, it is removed from the display and put in the scrap. Labels already in the scrap are not affected.

If a data series is selected, the series is excluded from the chart but is not deleted. It is marked with a hyphen in the "Incl." column on the List screen.

To restore items from the scrap, see the Insert Scrap command. To remove the contents of the scrap see the Transfer Clear Scrap command.

Entry

List, Chart menus

```
COMMAND: Alpha Chart Format Gallery Help List Modify
         Name Options Print Quit Sort Transfer Value
```

Purpose

To display the selected data series on the screen for viewing, editing, and formatting. Displays the Entry menu at the bottom of the screen.

The Entry screen looks like this:

```
                              X                 Y
1                         January            369248
2                        February            378432
3                           March            400012


COMMAND: Alpha Chart Format Gallery Help List Modify
         Name Options Print Quit Sort Transfer Value
Select option or type command letter
L1   Entry  Series:                98% Free   Microsoft Chart: census
```

Format

List, Entry menus

```
FORMAT: Category Value
```

Chart menu

```
FORMAT: Arrow Color Link Pattern Size Type Weight
```

Purpose

The List and Entry menu Format commands control the way the categories and values appear on the Entry screen and on the chart. The Chart menu Format commands control the graphic aspects of the chart. See the following pages for details.

Remarks

On the List screen, the Format commands apply to the selected series. On the Entry screen, they apply to the series on the screen. On the Chart screen, the Format commands apply to the selected object. If the chosen Format command cannot be completed for the selected object, you will see the message: "Cannot apply command to selected object."

Note

The command fields for some Format commands differ depending on the type of object selected.

Many of the Chart menu Format fields have an accompanying field with two possible responses: *Auto* and *Set*. *Auto* means that Chart will determine an appropriate response for the accompanying field based on built-in design principles. *Set* means you have chosen a specific response in the accompanying field.

In fields that control colors, patterns, marker types, and fonts, both the automatic settings and the lists of choices that can be viewed with the direction keys will be based upon the available features of the device specified in the "device" field.

See "Auto-Set Fields" in Chapter 6 and "Printing Charts" in Chapter 8 for more information.

Format Arrow

Chart menu

```
head:Narrow Medium Wide                open:Yes No
head size:Off Short Medium Long  distance:     :Auto Set
points to:Category-axis Series/point Title Value-axis Free
series,point number:                position:
```

Purpose

To change the appearance of the arrowhead and where the arrow points.

Remarks

Arrows show the connection between a label and the object the label describes. In Chart, an arrow is part of the label it is attached to. This command can be chosen only if a label is selected.

The arrow originates from the point on the label frame that is closest to the destination of the arrow. When the Format Arrow command is carried out, the label's pattern in the "arrow" field of the Format Pattern command changes to Solid. This makes the arrow visible.

Command Fields

head:

Narrow, *Medium*, and *Wide* refer to the width of the arrowhead.

open:

Yes means the arrow will be open; *No* means it will be solid.

head size:

Short, *Medium*, and *Long* refer to the length of the arrowhead. *Off* means there will be no arrowhead.

distance: **:Auto Set**

Enter how much space you want between the tip of the arrow and the object the arrow points to. You choose whether the measurement is in inches or centimeters by your response in the "unit" field of the Options command. *Auto* means Chart will determine the distance.

points to:

Choose the object you want the arrow to point to: the category axis, value axis, chart title, or series/point. If you choose series/point in this field, indicate the number of the specific series/point in the next field. *Free* means that the arrow points not to a particular object but to a specific point on the chart, indicated in the "position" field.

Selecting an object (a response other than *Free*) for the arrow to point to is called relative positioning. The advantage of relative positioning is that if the object moves, the arrow will move with it automatically. For example, if you move the title when "Title" is selected in the "points to" field, you will not have to reposition the arrow. It will move with the title. Choosing *Free* sets the position of the arrow; it will stay exactly where it is on the screen unless you reposition it.

series,point number:

Enter the number of the series you want the arrow to point to. If you want the arrow to point to a data point, enter the series number, a comma, and the number of the data point within that series. When this field is highlighted, you can step through the series/point numbers by using the direction keys.

position:

This field applies only if *Free* has been selected in the "points to" field, making the arrow's position absolute. The coordinates in this field indicate exactly where the arrow points on the screen.

Use the direction keys to move the selection arrow to the place you want the arrow to point. Coordinates indicating the position of the endpoint of the arrow appear in this field. The coordinates are in the form YnnXnn, with Y0X0 being the lower left corner of the screen or paper. You can choose whether the numbers represent inches or centimeters by your response in the "unit" field of the Options command. You can also type the coordinates directly. For more information on coordinates, see the Move command.

Format Category

List, Entry menus

```
align:Center Left Right          # of characters:   :Auto Set
text before:                                text after:
number format:Exp Fix Gen Int $ %    # of decimals:
scale factor:       date format:Short Medium Long
show year:Yes No    show quarter:Yes No    show month:Yes No
show day:Yes No     show day of the week:Yes No
```

Purpose

To change the appearance of data in the category column; to view the current format.

Remarks

The format determines how the data will appear on the Entry screen and on the chart.

Command Fields

align:

Choose *Center*, *Left*, or *Right* to center the contents or to align them to the left or to the right within the space specified by the "# of characters" field and within the label frame on the chart.

# of characters: :Auto Set

Enter the number of characters that you want showing in the category column of the Entry screen. The category and value columns on the Entry screen are 20 characters wide. This is the maximum number of characters that Chart displays on the Entry screen. However, you can enter text, dates, and numbers up to 254 characters long on the Entry screen and Chart will display them on the Chart screen.

For categories in Date and Text series that are longer than this field, only the first part of the date or text will show. For longer categories in Number and Sequence series, a row of number signs (##########) will show to prevent partial numbers from looking as if they are complete. The number of characters includes any text entered in the "text before" or "text after" fields described below.

text before:

Enter any text you want to appear immediately before each category both on the Entry screen and in labels on the chart. This field may be left blank.

text after:

Enter any text you want to appear immediately after each category both on the Entry screen and in labels on the chart. This field may be left blank.

number format:

Choose one of the following:

Exp	Numbers are displayed in scientific notation: decimal notation times a power of ten. For instance, 2.1E6 stands for 2100000. Specify the number of decimal places you want in the "# of decimals" field.
Fix	Numbers are displayed rounded to the number of decimal places specified in the "# of decimals" field.
Gen	Numbers are displayed as precisely as possible in the available space, with scientific notation used automatically, as needed.
Int	Numbers with a decimal fraction are rounded to integers.

$	Numbers are displayed as dollar amounts with a leading dollar sign and the number of decimal places specified in the "# of decimals" field. Negative amounts are shown in parentheses.
%	Numbers are displayed as percentages with the number of decimal places specified in the "# of decimals" field. For example, if the number of decimals is zero, .1 is displayed as 10%.

This field affects Number and Sequence series only.

# of decimals:

Enter the number of places you want to show to the right of the decimal point. This field affects the categories in Number and Sequence series only.

scale factor:

All categories will be divided by the number you enter here. For example, if you enter *1000* here and *K* is in the "text after" field, the category "10000" will appear as "10K" both on the Entry screen and on the chart. This field is relevant for Number and Sequence series only.

date format:

Choose one of the following:

Short	1/5/83 Q1 W
Medium	Jan 5, 1983 Quarter 1 Wed
Long	January 5, 1983 First Quarter Wednesday

This field affects Date series only. These examples show all parts of the date. The next five fields determine which parts actually show.

show year:
show quarter:
show month:
show day:
show day of week:

Choose *Yes* for each part of the date you want to show. These fields have an effect for Date series only.

Format Color

Chart menu

Purpose

To change the color of parts of chart objects.

Remarks

The command fields vary depending on the object selected.

Command Fields

For an axis (except in pie chart):

```
FORMAT COLOR  axis:                  labels:
        major grid:                   frame:
        minor grid:              background:
```

Note

Tick marks have the same color as the axis.

For Axis None in a pie chart:

```
FORMAT COLOR frame:
        background:
```

For a data series or point in an area, bar, column, or pie chart:

```
FORMAT COLOR area:                 : Auto Set
             border:               : Auto Set
```

For a data series or point in a line or scatter chart:

```
FORMAT color:                      : Auto Set
```

For an entire line chart:

```
FORMAT COLOR frame:        drop lines:
         background:     hi-lo lines:
```

For an entire area chart:

```
FORMAT COLOR frame:        drop lines:
         background:
```

For an entire bar, column, pie, or scatter chart:

```
FORMAT COLOR frame:
         background:
```

For a legend:

```
FORMAT COLOR labels:          frame:
           background:
```

For a label:

```
FORMAT COLOR text:            frame:
         background:          arrow:
```

The following list includes all valid base colors supported by Chart:

Red	Fuchsia	Blue
Teal	Yellow	White
Magenta	Turquoise	Green
Orange	Black	Purple
Cyan	Chartreuse	Gray

Availability of these colors depends on the output device you've specified in the "device" field of the Print Setup command; that is, Chart will provide any of the above colors that your device is capable of producing. If your device does not support a color on the above list, Chart will provide the closest alternative. For example, if your device does not support turquoise, Chart will instruct it to use blue instead.

When filling in command fields, you can either type the name of the color you want or use the direction keys to step through a list of colors supported by your particular output device.

Use the RIGHT key to step forward through the list, and the LEFT key to step backward through the list.

Note

Some devices also support various shades of some colors. You will see the names of these colors, for example light blue, as you step through the list of supported colors.

If you are using a color graphics monitor and have installed an enhanced graphics card, you can display the following colors on the screen:

Blue	Dark Blue	Green	Dark Green
Cyan	Dark Cyan	Magenta	Dark Magenta
Red	Dark Red	Yellow	Dark Yellow
Gray	Dark Gray	Black	White

You can type the name of the color you want or use the RIGHT key to step forward, and the LEFT key to step backward, through the list of available colors. As usual, if you type the name of a color that the enhanced graphics card does not support, Chart will provide the closest alternative.

If you are using an output device such as the Polaroid Palette or VideoShow 150, you can modify the shade or tone of any supported color. Use the UP key to modify colors through the following sequence of shades:

Medium light Light Extra light White

Use the DOWN key to darken the shade of any color, according to the following sequence:

Medium dark Dark Extra dark Black

Use the PAGE UP key to modify the tone of any color with gray, according to the following sequence:

All color 50% gray All gray

Use the PAGE DOWN key to reverse the sequence, that is, to go from all gray back to the originally selected color.

By modifying the basic colors available to you, as described above, you can select from a broad range of tonal combinations. For example, you can specify a color such as medium light gray green.

Note

If you've selected black, white, or any gray-modified color, and wish to select a different color, either:

- Type the name of the color you want.
- Press the HOME key (Chart automatically selects red for you); then use the RIGHT or LEFT key to step through a list of the other available colors.

Format Link

Chart menu

```
FORMAT LINK current chart to chart #:
       link height:Yes No        width:Yes No
       link value axis:Yes No    category axis:Yes No
```

Purpose

To establish and dissolve connections between charts. The charts may be separate (see the Split and Insert Chart New commands) or overlaid (see the Insert Chart Overlay command).

Command Fields

current chart linked to chart #:

Enter a number. This will be the master chart to which the current chart will be linked. A response of zero in this field means the chart will not be linked to any other chart.

The chart number appears after the word "Chart" in the lower left corner of the screen when that chart is selected; do not confuse it with the box number in the Split command.

link height:

Choose *Yes* to make the height of the plot area of the current chart equal to the height of the plot area of the master chart.

width:

Choose *Yes* to make the width of the plot area of the current chart equal to the width of the plot area of the master chart.

link value axis:

Choose *Yes* to make the range of values displayed on the value axis the same as that on the master chart. To determine the range, Chart takes into account the values of all data series included in both charts.

category axis:

Choose *Yes* to make the number of categories on the category axis the same as that on the master chart. Chart determines the number of categories by taking into account the number of categories in all the data series included in both charts.

Format Pattern

Chart menu

Purpose

To change the pattern of objects and their parts, and to make them visible or invisible.

Remarks

The command fields vary depending on the type of object selected.

Anything with the Clear pattern is invisible: it does not appear on the chart regardless of its color. Anything underneath it will show through. The White pattern refers to the background of the whole drawing—the screen or paper the chart is printed on is usually white.

The Clear pattern is transparent, like glass; White is opaque, like paper. The difference becomes apparent when two objects overlap. If the one "on top" has the White pattern, that part of the first object covered by the second will not show through.

Command Fields

For an axis:

```
FORMAT PATTERN axis:          frame:     : Auto Set
               major grid:    background:  : Auto Set
               minor grid:
```

For Axis None in a pie chart:

```
FORMAT PATTERN frame:                    :Auto Set
               background:               :Auto Set
```

For a data series or point in an area, bar, column, or pie chart:

```
FORMAT PATTERN area:                     : Auto Set
                  border:                : Auto Set
```

For a data series or point in a line or scatter chart:

```
FORMAT PATTERN line:                    : Auto Set
```

For an entire line chart:

```
FORMAT PATTERN frame:                   : Auto Set
          background:                   : Auto Set
          drop lines:                  hi-lo lines:
```

For an entire area chart:

```
FORMAT PATTERN frame:                   : Auto Set
          background:                   : Auto Set
          drop lines:
```

For an entire bar, column, pie, or scatter chart:

```
FORMAT PATTERN frame:                   : Auto Set
          background:                   : Auto Set
```

For a legend:

```
FORMAT PATTERN frame:                   : Auto Set
          background:                   : Auto Set
```

For a label:

```
FORMAT PATTERN frame:                   : Auto Set
          background:                   : Auto Set
               arrow:                   : Auto Set
```

Enter any valid pattern or use the direction keys to step through a list of available patterns.

The automatic setting and the list of available patterns are based upon the available patterns of the device specified in the "device" field of the Print Setup command.

Figures 9.1 and 9.2 show all valid patterns. Enter any of these names by typing. If the pattern you type is not available for the device on which the chart is being displayed or printed, Chart substitutes the nearest equivalent pattern.

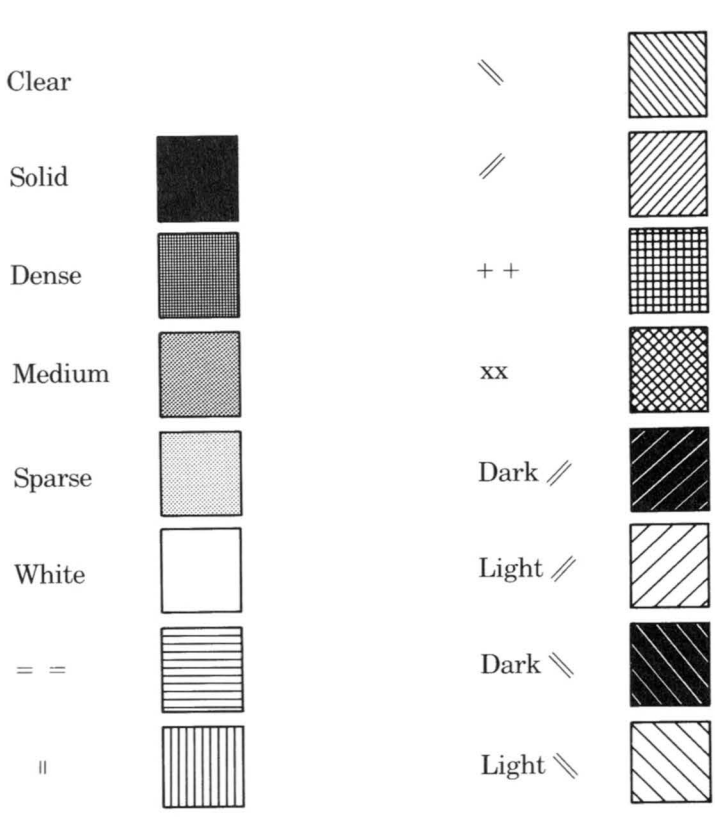


Figure 9.1. Valid Area Patterns

Note

Sparse patterns, such as // or || , may not work well because the chart line may in some places pass between the pattern lines, and, therefore, appear to be broken. Changing the weight of the line with the Format Weight command, however, may solve the problem.

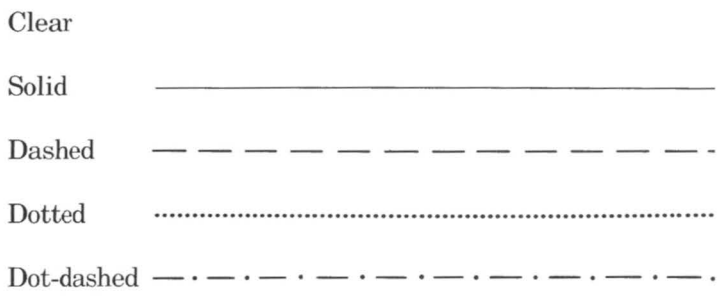


Figure 9.2. Valid Line Patterns

Format Size

Chart menu

```
FORMAT SIZE width:          height:          : Auto Set
```

Purpose

To change the size of an object's frame.

Remarks

The screen size determines the size of the chart displayed on the screen. The display area specified in the Print Options command in the Chart menu determines the size of the printed chart.

Any object on a chart may be no larger than the chart.

Command Fields

width: height: :Auto Set

Enter numbers representing the width and height of the object in units. You choose whether the units are inches or centimeters by your response in the "units" field of the Options command. You can also use the direction keys to change the size of the object. See "Moving Objects and Changing Size" in Chapter 6 for an explanation.

The Auto-Set field refers to both fields. *Auto* means that Chart will adjust the size of the frame of the object. For example, if the object is a label, *Auto* means that the frame will be just large enough to accommodate the label. If the text of the label changes in length, the frame will change accordingly.

Format Type

Chart menu

Purpose

To control chart format elements not covered by other Format commands.

Remarks

The command fields vary depending on the object selected. See the following pages for details on how this command applies to:

- Axes
- Charts
- Data series or points in a line or scatter chart
- Data series or points in an area, bar, column, or pie chart
- Labels
- Legends
- Wedges of a pie chart

Format Type
(Axis Selected)

Chart menu

```
FORMAT TYPE labels for tick marks: None Axis Low High
       major tick marks: None Cross Inside Outside
       minor tick marks: None Cross Inside Outside
       tick label font:            size:        : Auto Set
       label distance:                          : Auto Set
```

Purpose

To change the type of the tick marks and tick mark labels of the selected axis.

Remarks

To control the spacing of the tick marks, the interval at which tick mark labels appear on the category axis, or to change the direction of the scale, see the Range commands.

Command Fields

labels for tick marks:

Choose one of the following:

None	No tick mark labels.
Axis	Tick mark labels will appear next to the axis.

Low — Tick mark labels will appear at the low end of the range. If the value axis is selected, labels will come before the lowest or first category (e.g., first date on category axis). If the category axis is selected, labels usually will be at the low end of the value axis. Low is standard for most charts.

High — Tick mark labels will appear at the high end of the range. If the value axis is selected, labels will come after the last category (usually highest number or latest date). If the category axis is selected, labels will be at the high end of the value axis.

See also the "label distance" field below.

major tick marks:
minor tick marks:

Choose one of the following:

None — No tick marks will show.

Cross — The tick marks will cross the axis.

Inside — The tick marks will extend from the axis into the plot area.

Outside — The tick marks will extend from the axis away from the plot area.

tick label font:

The Auto-Set field for the "size" field applies to this field also.

Enter any valid font name or use the direction keys to step through a list of available fonts. The automatic setting and the list of available fonts are based upon the available fonts of the device specified in the "device" field of the Print Setup command. See Appendix A, "Fonts," for details on how to use fonts.

size: :Auto Set

Enter a size in points or use the direction keys to step through the available sizes. A point is 1/72 of an inch. The maximum size is 127 points. The size of the type in this book is 10 points. You may enter the size in whole or half points (for example, 12 or 12.5).

The Auto-Set field applies to the "tick label font" field also. See Appendix A, "Fonts," for a list of available sizes, font names, and samples, and additional information about fonts.

label distance: :Auto Set

Enter a measurement for the distance between the tick mark labels and the axis or frame, as determined by the response in the "labels for tick marks" field. For vertical axes, the distance is measured from the end of the label; for horizontal axes, it is measured from the top or bottom of the label. The measurement may be negative. You choose whether the measurement is in inches or centimeters, by your response in the "unit" field of the Options command.

Format Type
(Chart Selected)

Chart menu

```
type: Area Bar Column Line Pie Scatter
series:       :Auto Set      vary by categories: Yes No
100%: Yes No  stacked: Yes No          pie start angle:
cluster spacing %:     bar spacing %:   overlap: Yes No
frame type: Normal Bevel Double Round Shadow
```

Purpose

To change the type of the selected chart.

Remarks

If there is only one chart, this command applies to it. If there is more than one chart (overlaid or multiple charts), this command applies to the selected chart only. You can select a chart with the direction keys. For more information on selecting, see "Selecting Objects" in Chapter 6. For information on having more than one chart, see Chapter 7, "Working With More Than One Chart."

Note

Negative values cannot be represented meaningfully in pie charts, stacked charts (including area charts), 100% charts, and charts with logarithmic scales. Chart does the best it can with negative data in these cases, but the results should not be interpreted as correct.

Command Fields

type:

Choose *Area*, *Bar*, *Column*, *Line*, *Pie*, or *Scatter*. See the Gallery command for descriptions. (Hi-lo is not a basic chart type. A hi-lo chart is created by adding hi-lo lines to a line chart.)

series: :Auto Set

Enter the line numbers of the series in the List you want to include in the selected chart. Separate the numbers with commas. The order in which you enter them here is the order in which they are charted, regardless of the order in which they appear in the List.

Use this field only when you need precise control over series distribution when there is more than one chart.

vary by categories:

This field applies if the chart includes a single series only. *Yes* means that the colors or patterns of the data points are varied. *No* means that the data points will all have the same color or pattern. In the pie chart gallery, pies 1, 3, 4, 5, and 6 all vary by categories; pie 2 does not. See the Gallery Pie command for illustrations.

100%:

Choose *Yes* to scale the category values of all series charted so they add up to 100 percent. The original values do not appear on the chart. The data itself is not altered. This field makes sense only if there is more than one data series included in the chart and if the response in the "stacked" field is *Yes*.

stacked:

Choose *Yes* or *No*. *No* means that each data series is measured from the category axis. *Yes* means that the series are charted one on top of the other. The first value is measured directly from the category axis; the second value, belonging to the second series charted, is measured from the top of the first value; the third value is measured from the top of the second,

and so on. Each series takes up an amount of space in each category corresponding to its value for that category. This field affects area, bar, column, and line charts only. The column chart gallery has two stacked charts. Number 5 is also 100%; number 3 is not. All the charts in the area chart gallery are stacked.

pie start angle:

Enter a number from 0 to 360 representing the angle between the leading edge of the first wedge and the twelve o'clock position (zero), measured clockwise. This causes the pie to be rotated by that amount.

cluster spacing %:

Enter a number indicating the amount of space between clusters of bars or columns. The number represents a percentage of the width of a single bar or column; it must be between 0 and 100. This field affects bar and column charts only. For example, if bars are one inch wide and the response in this field is 25, there will be one-quarter inch between clusters.

bar spacing %:

This field affects bar and column charts only. In this field, "bar" refers either to bars or columns. The number you enter in this field indicates either:

1. The amount of space between columns or bars within a cluster

   or

2. The amount of overlap of bars or columns within a cluster.

For an example of overlap and spacing, see Figure 6.10 in Chapter 6.

The number in this field represents a percentage of the width of one bar or column, and must be between 0 and 100. The next field determines whether the number represents space or overlap. For example, if bars are one inch wide and the responses in this field and the next (overlap) are *25* and *Yes* respectively,

the bars in a cluster will overlap by one-quarter inch. Stacked charts are normally overlapped 100%.

overlap:

Choose *Yes* to make the bars or columns within a cluster overlap, *No* to leave space between them. The amount of overlap or space is determined in the previous field. This field affects bar and column charts only. In this field, bar refers to both bars and columns.

frame type:

Select the type of frame to go around the chart. You can make a Normal frame invisible by choosing *Clear* as the frame pattern. To make a Normal frame visible, set its pattern to a pattern other than Clear with the Format Pattern command. If you select any other type of frame, the chart frame pattern will automatically be Solid. Use Format Pattern to give it an alternative pattern. Examples of the frame types are shown in Figure 9.3.

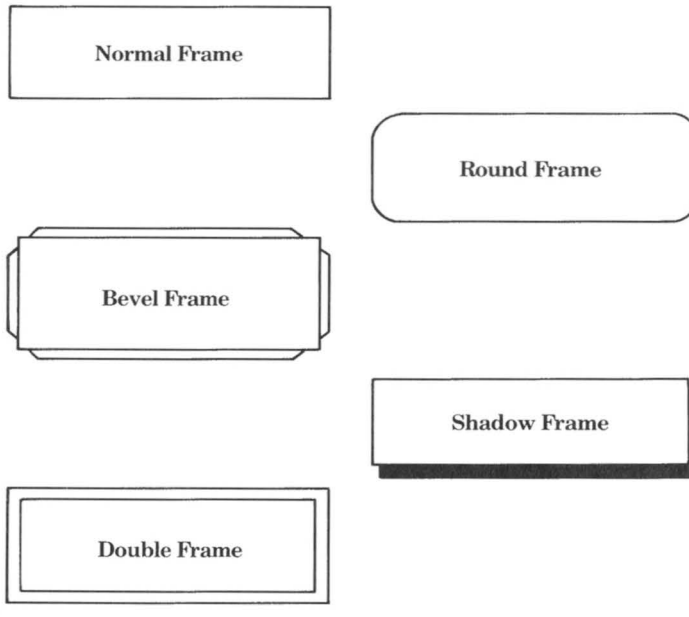


Figure 9.3. Frame Types

Format Type
(Label Selected)

Chart menu

```
text:Auto Set    distance:              :Auto Set
label for:Category-axis Series/point Title Value-axis Free
series,point number:          direction:Horizontal Vertical
show key:Yes No              show value:Yes No
horiz.align:Center Left Right  vert.align:Bottom Center Top
frame type:Normal Bevel Double Round Shadow
font:                    size:          :Auto Set
```

Purpose

To change the object which determines a label's contents and position, and to format the label's text.

Remarks

To edit the text of the label, either change the relevant name or category of the object specified in the "label for" and "series,point number" fields or select the label and edit the text with the Alpha command.

Command Fields

text:

Choosing *Auto* means that the text of the label will come from the object specified in the "label for" and "series, point number" fields below. Selecting the label and editing its contents with the Alpha command changes the response in this field to *Set*.

distance: :Auto Set

Enter how much space you want between the label and the object specified in the "label for" and "series,point number" fields below. The distance may be negative. You can choose whether the unit of measurement is inches or centimeters by your response in the "unit" field of the Options command.

label for:

If the response in the "text" field is *Auto*, the response in this field controls the contents of the label and the position of the label. *Free* means that the text does not come from any other object; you enter the label's text with the Alpha command.

Category-axis — The label's text comes from the category name of the first series in the List. The label will be centered below or to the left of the axis.

Series/point — If a series is indicated in the "series,point number" field, and the response in the "show value" field is *No*, the label's text comes from the name of the series. If a point is selected and the response in the "show value" field is *No*, the label's text comes from the category of the data point. In general, Chart places the label as close as possible to the series or category specified in the "series,point number" field. The exact position depends on the type of chart.

Title — The label's text comes from the series name of the first series in the List. The label is centered at the top of the chart frame. A set response in the "distance" field lowers the label by the amount specified.

Value-axis	The label's text comes from the value name of the first series in the List. The label will be centered below or to the left of the axis.
Free	You must enter the label's text with the Alpha command. The label is positioned with the Move command.

series,point number:

Enter a series number or a series number followed by a comma and a data point number. When this field is highlighted, you can use the direction keys to step through all the series/point numbers and choose the one you want.

direction:

Horizontal is the normal way of presenting text. If you choose *Vertical*, the text will be displayed in columns, each character beneath the previous one. Multiple columns are used if the text is too long to fit in one column.

show key:

If the response in the "label for" field is *Series/point*, a response of *Yes* in this field means that a small indicator of the series/point's pattern or color is placed before the text.

show value:

If the response in the "distance" field is *Series/point*, a response of *Yes* in this field means that the label's text is derived from the value of the data point specified in the "series,point number" field. *No* means that the category name becomes the label's text. If only a series number is specified, Chart takes the label's text from the value of the last data point in the series. Chart formats the text according to the responses in the Format Value command for that series.

horiz.align:

Choose *Center, Left,* or *Right* to align the text to the center, left, or right within the label's frame.

vert.align:

Choose *Bottom, Center,* or *Top* to align the text to the bottom, center, or top of the label's frame.

frame type:

Select the type of frame to go around the label. You can make a Normal frame invisible by choosing the Clear pattern. To make a Normal frame visible, choose any pattern other than clear with the Format Pattern command. If you select any other type of frame, Chart automatically makes the label frame pattern Solid. To give it another pattern, use the Format Pattern command. See the Format Type command (chart selected) to see the frames that are available.

font:

Enter any valid font name or use the direction keys to step through a list of available fonts.

The automatic setting and list of available fonts are based on the available fonts of the device specified in the "device" field of the Print Setup command.

The Auto-Set field for the "size" field applies to this field also. See Appendix A, "Fonts," for details on how to use fonts.

size: :Auto Set

Enter a size in points or use the direction keys to step through the available sizes. A point is 1/72 of an inch. The maximum size is 127 points. The size of the type in this book is 10 points. You may enter the size in whole or half points (for example, 12 or 12.5).

The Auto-Set field applies to the "font" field as well as to this one. See Appendix A, "Fonts," for a list of available sizes, font names and samples, and additional information about fonts.

Format Type
(Legend Selected)

Chart menu

```
FORMAT type: Bottom Corner Top Vertical series: :Auto Set
       frame type: Normal Bevel Double Round Shadow
       Show legend:Auto Set   spacing:Close Medium Open
       font:                  size:             :Auto Set
```

Purpose

To change the style and general position of the legend.

Remarks

The legend type refers to the general placement of the legend relative to the rest of the chart. The Format Size and Move commands allow more precise positioning. See "Moving Objects and Changing Size" in Chapter 6 to see how moving a legend will affect your chart. Once the legend has been moved, this command changes only the legend's format, not its position.

Command Fields

type:

Choose one of the following:

Bottom — The entries appear one after another on the same line. Chart centers the legend at the bottom of the chart frame.

Corner — The entries appear on successive lines, one below the other. Chart puts the legend in the upper right corner of the chart frame.

Top	The entries appear one after another on the same line. Chart centers the legend at the top of the chart frame.
Vertical	The entries appear on successive lines, one below the other. Chart centers the legend at the right side of the frame.

series: :Auto Set

Fill in this field if you want to control which series names appear in the legend, or if you want to change the order of series names in the legend. Type the numbers of the series whose names you want to appear, separating each number with a comma (for example, *2,1,3*). Series names will appear in the order you specify.

frame type:

Select the type of frame to go around the legend. The default frame for legends is Normal; the default frame pattern is Solid. To change the pattern, use the Format Pattern command. See the Format Type command (chart selected) to see the frames available.

show legend:

Auto means that Chart determines whether a legend appears. Inclusion of a legend depends on the number of series, type of chart, and other aspects of the chart. If you choose *Set*, you determine the presence or absence of a legend with the Insert Legend and Delete commands.

spacing:

Chart formats the legend's contents to divide the available space within the legend frame evenly. This field determines the space available when the legend size is automatically controlled by Chart. It is ignored if you set the size. Options are:

Close	Minimal space between entries
Medium	Moderate space between entries
Open	Large space between entries

font:

Enter any valid font name or use the direction keys to step through a list of available fonts.

The automatic setting and the list of available fonts are based upon the available fonts for the device specified in the "device" field of the Print Setup command.

The Auto-set field for the "size" field applies to this field also. See Appendix A, "Fonts," for details on how to use fonts.

size: :Auto Set

Enter a size in points or use the direction keys to step through the available sizes. A point is 1/72 of an inch. The maximum size is 127 points. The size of the type in this book is 10 points. You may enter the size in whole or half points (for example, 12 or 12.5).

The Auto-Set field applies to the "font" field as well as this one. See Appendix A, "Fonts," for a list of available sizes, font names and samples, and additional information about fonts.

Format Type
(Pie Chart Wedge Selected)

Chart menu

```
series/point label:Yes No  value label:Yes No  as %:Yes No
exploded distance %:
```

Purpose

To "explode" a wedge in a pie chart. To control wedge labels.

Command Fields

series/point label:

Choose *Yes* if you want the wedge to be labeled with its category.

value label:

Choose *Yes* if you want each wedge in the pie to be labeled with its value. The Format Value command determines the format of the label's text.

as %:

This field has an effect only if the response in the "value label" field is *Yes*. In that case, a response of *Yes* in this field means that the label will show the value expressed as a percentage of the total values of all the data points in the series. *No* means that the absolute value will show. Values are rounded for display purposes and may not add up to 100%.

exploded distance %:

Enter a number representing a percentage of the length of the radius. The wedge will be exploded or moved away from the center of the circle by that distance along the line that divides the wedge angle in half.

Format Type
(Series/Point in Area, Bar, Column, or Pie)

Chart menu

```
FORMAT TYPE series/point label:Yes No   value label:Yes No
```

Purpose

To control the category and value labels.

Command Fields

series/point label:

Choose *Yes* if you want the selected series or point to have a label. If the chart includes one series only, the contents of the label for the selected data point will come from the data point's category. If the chart includes more than one series, the label for the selected series will appear near the last data point in the series. Its text will come from the series name. Series/point labels will have the same default format unless you change one of them. This default format is the same as that of the master series/point label.

value label:

Choose *Yes* if you want the selected series or point to have a label. If the chart includes one series only, the contents of the label for the selected data point will come from the data point's value. If the chart includes more than one series, each data point in the selected series will get a value label. Use the Format Value command to format the label's text. Value labels will have the same format unless you change one of them. This format will be the same as that of the master value label.

Format Type
(Series/Point in Line or Scatter Chart)

Chart menu

```
FORMAT TYPE of marker:                : Auto Set
    series/point label: Yes No        value label: Yes No
```

Purpose

To change the type of markers used for the data points of the selected series in line and scatter charts. Controls the appearance of series/point and value labels.

Remarks

If the chart includes one series only, this command affects the selected data point. If the chart includes more than one series, this command affects the selected series. This command affects only the markers themselves. To change the style of the line connecting the markers, use the Format Pattern command.

Command Fields

of marker: :Auto Set

Enter any valid marker type or use the direction keys to step through a list of available marker types.

The automatic setting and the list of available marker types are based upon the available marker types of the device specified in the "device" field of the Print Setup command.

The following list includes all valid marker styles. You can enter any of these styles by typing. If the marker style you type is not available for the device on which the chart is being displayed or printed, Chart substitutes the nearest equivalent.

Valid Marker Styles

Filled o
o
Filled box
Hollow box
+
X
*
-
None (no marker will appear)

series/point label:

Choose *Yes* if you want the selected series or point to have a label. If the chart includes one series only, the label's text for the selected data point will come from the data point's category. If the chart includes more than one series, the label for the selected series will appear near the last data point in the series, and the label's text will come from the series name. Series/point labels will have the same default format unless you change one of them. This default format is the same as that of the master series/point label.

value label:

Choose *Yes* if you want the selected series or point to have a label. If the chart includes one series only, the label's text for the selected data point will come from the data point's value. If the chart includes more than one series, each data point in the selected series will have a value label. Use the Format Value command to format the label's text. Labels will have the same default format unless you change one of them. This default format is the same as that of the master value label.

Format Value

List, Entry menus

```
align: Center Left Right     # of characters:     : Auto Set
text before:                                  text after:
number format: Exp Fix Gen Int $ %     # of decimals:
scale factor:
```

Purpose

To change the appearance of data in the value column on the Entry screen.

Remarks

The format determines how the data will appear on the Entry screen and on the chart.

Command Fields

align:

Choose *Center*, *Left*, or *Right*. Chart aligns the contents to the center, left, or right within the space available.

# of characters: :Auto Set

Enter the number of characters that you want showing in the value column of the Entry screen. The category and value columns on the Entry screen are 20 characters wide. This is the maximum number of characters that Chart displays on the Entry screen. However, you can enter text, dates, and numbers up to 254 characters long on the Entry screen and Chart will display them on the Chart screen.

For values that are longer than the number of characters specified in this field (or 20 if it is set to *Auto*), a row of number signs (##########) will show to prevent partial numbers from looking as if they are complete. The number of characters includes any text entered in the "text before" or "text after" fields described below.

text before:

Enter any text you want to appear immediately before each value both on the Entry screen and in labels on the chart. This field may be left blank.

text after:

Enter any text you want to appear immediately after each value both on the Entry screen and in labels on the chart. This field may be left blank.

number format:

Choose one of the following:

Exp	Numbers are displayed in scientific notation; that is, decimal notation times a power of ten (for example, 2.1E6 for 2100000). Specify the number of decimal places you want in the "# of decimals" field.
Fix	Numbers are displayed rounded to a fixed number of decimal digits specified in the "# of decimals" field.
Gen	Numbers are displayed as precisely as possible in the available space, with scientific notation used automatically, as needed.

Int	Numbers with a decimal fraction are rounded to integers.
$	Numbers are displayed as dollar amounts with a leading dollar sign and the number of decimal places specified in the "# of decimals" field. Negative values are shown in parentheses.
%	Numbers are displayed as percentages with the number of decimal places you specify in the "# of decimals" field. For example, if the number of decimals is zero, .1 is displayed as 10%.

# of decimals:

Enter the number of places that you want to show to the right of the decimal point.

scale factor:

Enter a number. All values will be divided by the number you enter here. For example, if you enter *1000* here, the value 10,000 will appear as 10 both on the Entry screen and on the chart.

Examples

120 miles

3E5 km/sec

DM 1000.00

Format Weight

Chart menu

Purpose

To change the thickness of lines in axes and series/points and of drop lines and hi-lo lines in line charts.

Remarks

Command fields vary depending on the type of object selected.

Command Fields

Choose *Light*, *Medium*, or *Heavy*.

For an axis:

```
FORMAT WEIGHT axis: Light Medium Heavy
        major grid: Light Medium Heavy
        minor grid: Light Medium Heavy
             frame: Light Medium Heavy
```

Note

Tick marks have the same weight as the axis.

For Axis None in a pie chart:

```
FORMAT WEIGHT frame: Light Medium Heavy
```

For a data series or point of an area, bar, column, or pie chart:

```
FORMAT WEIGHT border: Light Medium Heavy
```

For a data series or point in a line or scatter chart:

```
FORMAT WEIGHT line: Light Medium Heavy
```

For an entire line chart:

```
FORMAT WEIGHT frame: Light Medium Heavy
         drop lines: Light Medium Heavy
       hi-lo lines: Light Medium Heavy
```

For an entire area chart:

```
FORMAT WEIGHT frame: Light Medium Heavy
         drop lines: Light Medium Heavy
```

For an entire bar, column, pie, or scatter chart:

```
FORMAT WEIGHT frame: Light Medium Heavy
```

For a legend:

```
FORMAT WEIGHT frame: Light Medium Heavy
```

For a label:

```
FORMAT WEIGHT frame: Light Medium Heavy
        arrow shaft: Light Medium Heavy
```

Drop lines occur only in area and line charts. Hi-lo lines occur only in line charts. Drop lines extend from the highest data point at every category down to the axis. Hi-lo lines extend from the highest data point at every category down to the lowest.

Gallery

All menus

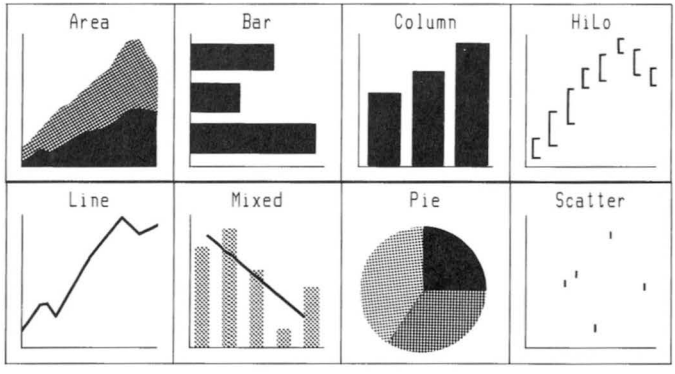
```
GALLERY:  Area Bar Column Hilo Line Mixed Pie Scatter
```

Purpose

To set the chart type and to go to the Chart menu (when invoked from List or Entry). The Gallery is a short way of setting several properties that you could also set with the Format command and other commands on the Chart menu.

Remarks

The Gallery looks like this:



When you choose a chart type, Chart displays several varieties of that type of chart (exception: there is only one type of hi-lo chart). Each variety represents a coordinated format. You can change the format with the Format commands.

With the Gallery command, you can quickly change several format elements to conform with the type of chart you choose. Some format elements are not established by the Gallery. Therefore, such format elements as the range of values displayed, colors, patterns, weights, text and position of free labels, and styles of markers are not changed by the Gallery command.

You do not have to wait for the Gallery to be drawn completely to select a chart type or cancel the Gallery command. As soon as you press any key, Chart stops drawing the Gallery. You may, for example, go directly to the column gallery by typing *GC* (for *G*allery *C*olumn). If you typed *C* immediately after choosing the Gallery command, you would not see the main Gallery. Pressing the CANCEL key at any time will return you to the Chart, List, or Entry screen, depending on where you were when you chose the Gallery command.

Note

Negative values cannot be represented meaningfully in pie charts, stacked charts (including area charts), 100% charts, and charts with logarithmic scales. Chart does the best that it can with negative values in these cases, but the results should not be interpreted as correct.

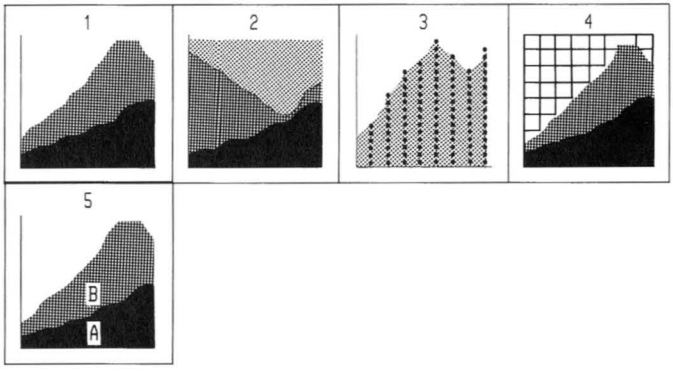
Gallery Area

All menus

```
GALLERY AREA: 1 2 3 4 5
```

Remarks

The area gallery looks like this:



The options in the area gallery are as follows:

1. Simple area chart
2. 100% area chart
3. Area chart with drop lines
4. Area chart with grids
5. Area chart with areas labeled

Area charts are best for displaying time series data when you need to emphasize the magnitude of the values. As compared to a line chart, area charts highlight size of the total value, rather than marginal changes between data points.

Stacked area charts highlight the change in components of the total over time as well as the total itself. Charts 1-5 are all stacked.

To get the kind of chart you want, type the number shown in the area gallery.

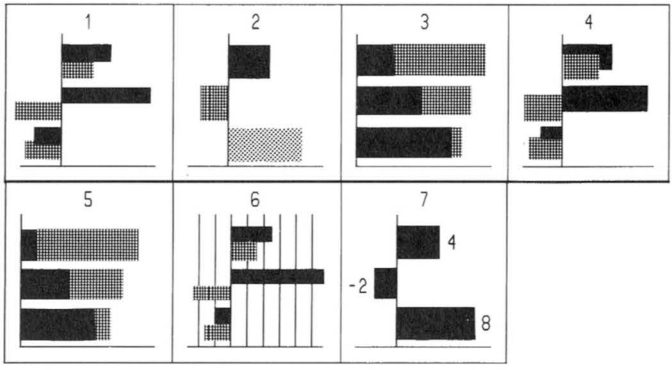
Gallery Bar

All menus

```
GALLERY BAR: 1 2 3 4 5 6 7
```

Remarks

The bar gallery looks like this:



The options in the bar gallery are as follows:

1. Simple bar chart
2. Bar chart for one data series with varied shading
3. Stacked bar chart
4. Overlapped bar chart
5. 100% stacked bar chart
6. Simple bar chart with vertical grid
7. Simple bar chart with value labels

Bar charts are best when you want to compare different items to each other, but not to a total. For example, a bar chart compares different companies' total revenues, but not their individual contribution to total industry sales. The items, or categories, are best placed on the vertical axis because most people expect categories along a horizontal axis to represent dates or time. The arrangement of different categories on the vertical axis is not critical.

To get the kind of chart you want, type the number shown in the bar gallery.

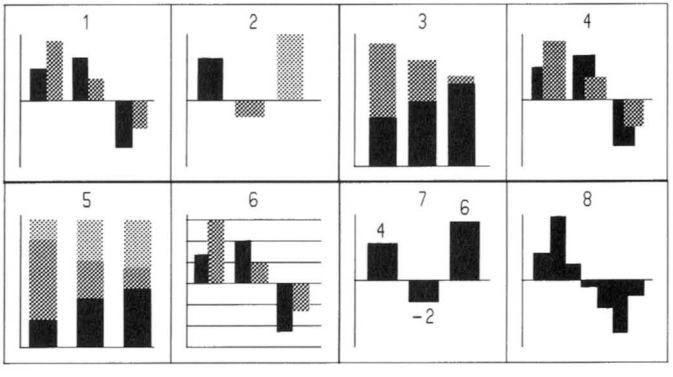
Gallery Column

All menus

```
GALLERY COLUMN: 1 2 3 4 5 6 7 8
```

Remarks

The column gallery looks like this:



The options in the column gallery are as follows:

1. Simple column chart
2. Column chart for one data series with varied shading
3. Stacked column chart
4. Overlapped column chart
5. 100% stacked column chart
6. Column chart with horizontal grid
7. Simple column chart with value labels
8. Step chart

Use a column chart to present time series data. Line charts fulfill the same purpose, but sometimes one is better than the other.

A column chart is best when:

- You want to emphasize clear differences, dramatic fluctuations, high variability, or the absolute magnitude of the values.
- You have a relatively small number of data points.

A line chart is best when:

- You want to emphasize the trend over time.
- You have a large number of data points.

To get the kind of chart you want, type the number shown in the column gallery.

Gallery Hi-lo

All menus

```
GALLERY HILO:
```

Remarks

There is only one hi-lo chart; therefore, there is no separate gallery for hi-lo. The highest and lowest values in each category are connected by a line.

Hi-lo charts are used for time series data that fluctuates within each time period as well as over time. Stock market data is commonly depicted with hi-lo charts. Such charts typically show the high, low, and close for a given day, week, month etc., as well as the trend over a time series of days, weeks, or months.

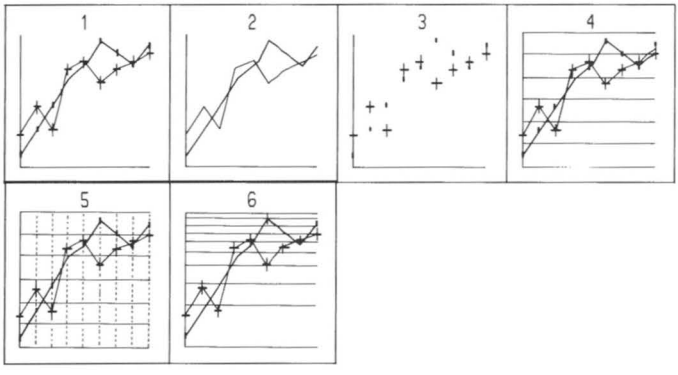
Gallery Line

All menus

```
GALLERY LINE: 1 2 3 4 5 6
```

Remarks

The line gallery looks like this:



The options in the line gallery are as follows:

1. Simple line chart with lines and points
2. Lines only
3. Points only
4. Lines with horizontal grid
5. Lines with horizontal and vertical grid
6. Lines on logarithmic scale and grid

Use line charts when you want to display trends of data over time. See the Gallery Column command for a more detailed description.

To get the kind of chart you want, type the number shown in the line gallery.

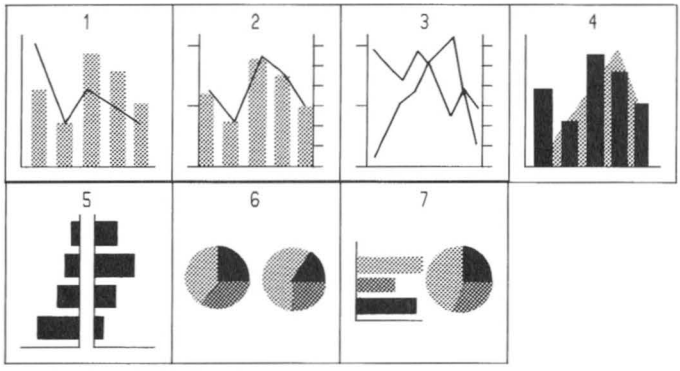
Gallery Mixed

All menus

```
GALLERY MIXED: 1 2 3 4 5 6 7
```

Remarks

The mixed gallery looks like this:



The options in the mixed gallery are as follows:

1. Column chart with overlaid line chart
2. Column chart overlaid by line chart with independent scale

3. Two line charts overlaid with independent scales

4. Area chart with overlaid column chart

5. Bar chart and opposing bar chart paired (correlation bar chart)

6. Two pie charts paired

7. Bar chart and pie chart paired

Mixed charts communicate a combination of messages. A mixed line and column chart, for example, could show monthly fluctuations in some variable like sales (columns) as well as cumulative sales over time (line). The line could also represent the trend line of monthly sales. Side-by-side bar charts attempt to highlight the relationship between variables, while side-by-side pie charts might contrast the relative proportions of components of a whole at two different points in time. Charts with two scales (like charts 2 and 3) allow you to compare related data which are not measured in the same units.

Chart distributes data series evenly between the two charts, except that a pie chart includes one series only. Most of the charts are linked. See the Format Link command.

To get the kind of chart you want, type the number shown in the mixed gallery.

Note

The mixed chart gallery formats the Chart screen such that you cannot use the Gallery command alone to return to a single chart of several data series. Mixed charts are made up of two or more data series that have been formatted into two or more charts, either overlayed or in two columns. To return to a single chart, you must return the screen to a single column and delete one of the two charts. See the "# of columns" field in the Split command.

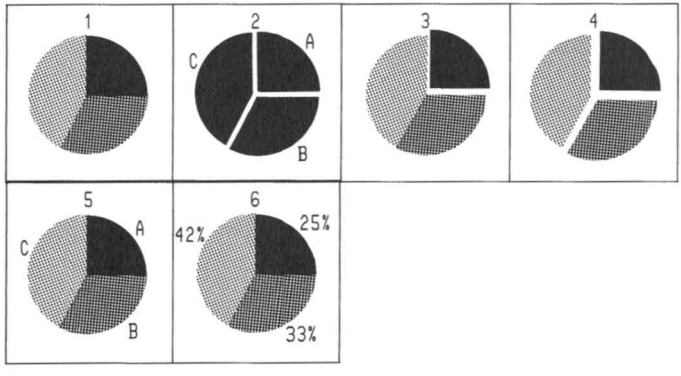
Gallery Pie

All menus

```
GALLERY PIE: 1 2 3 4 5 6
```

Remarks

The pie gallery looks like this:



The options in the pie gallery are as follows:

1. Simple pie chart

2. Pie chart with all wedges shaded the same and labeled with categories

3. Pie chart with first wedge exploded

4. Pie chart with all wedges exploded

5. Pie chart with category labels

6. Pie chart with value labels expressed as percentages

Circles communicate the impression of a whole or total, so pie charts convey the relative size of parts of a whole particularly well. Exploding a segment of the pie highlights it and causes the viewer to focus upon that element. For maximum readability, pie charts should have no more than six segments.

To get the kind of chart you want, type the number shown in the mixed gallery.

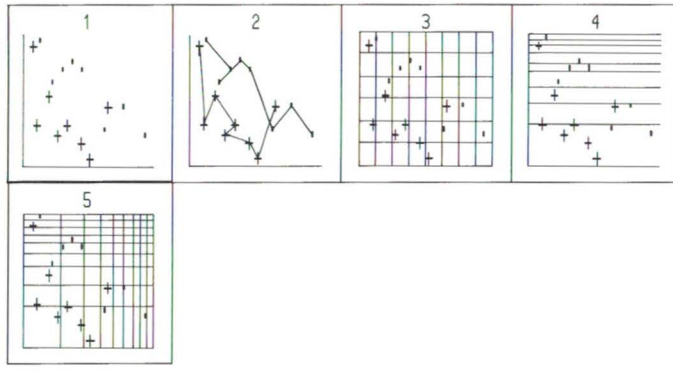
Gallery Scatter

All menus

```
GALLERY SCATTER: 1 2 3 4 5
```

Remarks

The scatter gallery looks like this:



The options in the scatter gallery are as follows:

1. Scatter chart with markers only

2. Scatter chart with markers from the same series connected by lines

3. Markers on grids

4. Markers on semi-logarithmic grid

5. Markers on log-log grid

Scatter charts highlight a relationship, if one exists, between two variables (that is, how variation in one relates to variation in the other). They are typically used with statistical or experimental data.

Data typically does not come in even intervals in a scatter chart. Line chart categories, for example, are evenly spaced, and data points fall either on or between category axis tick marks. Scatter chart categories are as the name implies—scattered—such that the category axis is essentially a value axis. Specifically, category axis dimensions account for the minimum and maximum values: actual data points fall in between. Scatter charts are meaningful only when used to plot Number series.

Each category does not neccessarily have a single value in a scatter chart.

To get the kind of chart you want, type the number shown in the scatter gallery.

Help

All menus

```
HELP: Resume Start Next Previous
      Auto-Set Commands Devices Keyboard
```

Purpose

To provide reference information about Chart.

Information about each command, command field, the keyboard, and other topics is stored in a file on the Program disk. This command displays the relevant information on the screen. When you are done reading, you can return to your work with Chart; everything will be exactly as it was before you asked for help.

To start at the beginning of the help information, choose the Help command from the main menu.

To see information on a specific command or command field:

1. Highlight the command in the menu with the BACKSPACE key or the spacebar, or highlight the command field you want with the TAB key.

2. Press the HELP key.

To return to your work with Chart, press *R* (for Resume).

Once in the Help command, you can choose any of the following commands:

Resume	Returns to the menu where you requested Help.
Start	Goes to the beginning of the Help file.

Next	Shows the next screenful of Help information. Often there is more information than will fit on a screen.
Previous	Shows the previous screenful of Help information.
Auto-Set	Explains about Auto-Set fields.
Commands	Goes to the Command Overview.
Devices	Shows a guide to the printer and plotters supported by Chart.
Keyboard	Shows a guide to the keyboard.

Include

List menu

```
INCLUDE: All None Series
```

Purpose

To mark series for inclusion in the chart or exclusion from the chart.

Remarks

This command provides a quick way to include all series, no series, or a specified group of consecutive series in the chart. The included series are marked with an asterisk (*) in the "Incl." column on the List screen. Series not included are marked with a hyphen (-).

Another way to include or exclude a series is to select the series with the direction keys, then type an asterisk (*) to include it or a hyphen (-) to exclude it.

The three commands are explained on the following pages.

Include All

List menu

```
INCLUDE ALL:
```

Purpose

To mark all series for inclusion in the chart with an asterisk (*).

Include None

List menu

```
INCLUDE NONE:
```

Purpose

To mark all series for exclusion from the chart with a hyphen (-).

Include Series

List menu

```
INCLUDE series:Yes No   # of series:     starting at line:
```

Purpose

To mark a designated group of series with an asterisk (*) or a hyphen (-) to either include them or exclude them from the chart.

Command Fields

series:

Choose *Yes* to include one or more consecutive series specified in the next two fields; choose *No* to exclude them.

# of series:

Enter how many consecutive series you want to include or exclude.

starting at line:

Enter the line number of the first series to include or exclude, or use the direction keys to highlight the first series.

Insert

Chart menu

```
INSERT: Chart Legend New-label Scrap
```

Purpose

To add a chart, legend, or label to the chart or to reinsert deleted charts or labels from the scrap.

Remarks

See the following pages and Chapter 7, "Working With More Than One Chart," for details on the Insert Chart New and Insert Chart Overlay commands.

Insert Chart

Chart menu

```
INSERT CHART: New Overlay
```

Purpose

To add a new chart to the display on the screen.

Remarks

The new chart may occupy a separate area on the screen or overlay an existing chart to create a more complex chart. Either way, each chart can be selected and changed individually with the Gallery and Format commands.

Chart redistributes the included series evenly among the charts, except that pie charts include only one series. See the "series" field in the Format Type command (chart selected) for how to control the distribution of series.

See the following pages for details on Insert Chart New and Insert Chart Overlay.

Insert Chart New

Chart menu

```
INSERT CHART NEW in box #:
```

Purpose

To insert a chart in the box you specify in the "in box #" field.

Remarks

For an explanation of how to divide the display into boxes, see the Split command. Once you insert the new chart, you can move it to any location on the display with the Move command.

Chart redistributes the included series evenly among the charts, except that pie charts include only one series. See the "series" field in the Format Type command (chart selected) for how to control the distribution of series.

Command Field

in box #:

Enter the number of the box where you want the new chart. Boxes are numbered left to right and top to bottom, beginning with the upper left box.

Insert Chart Overlay

Chart menu

```
INSERT CHART OVERLAY:
```

Purpose

This command creates a new chart that overlays the selected chart. The new chart is linked to the selected chart and is placed in the same box.

Remarks

The new chart will be a clustered column chart; responses in all Auto-Set fields will be *Auto*. You can select each chart and the objects in it individually and change them with the Gallery, Format, and Move commands. See the Format Link command for information on linking.

With this command you can create complex chart forms by overlaying different types of charts. You can also change the size and position of the overlaid chart.

The Gallery Mixed command provides several common types of overlaid charts.

Insert Legend

Chart menu

```
INSERT LEGEND:
```

Purpose

To insert a legend in the selected chart. The legend has the same format that was in effect the last time a legend was present.

Remarks

Use this command if you have deleted the legend and want to reinsert it. To change the appearance of the legend, select it and use the Format commands.

This command changes the response in the "show legend" field of the Format Type command (legend selected) to *Set*.

Insert New-Label

Chart menu

```
INSERT NEW-LABEL text:
```

Purpose

To add a new label to the selected chart.

Remarks

Chart inserts the label in the upper left corner of the plot area. If you include no data series in the chart, Chart inserts the label at the upper left corner of the chart. Once inserted, you can change the label's text with the Alpha command, its appearance with the Format commands, and its position with the Move command.

Command Field

text:

Type the text for the label. You can enter a line break by pressing the NEWLINE key. Press the RETURN key to carry out the command.

Insert Scrap

Chart menu

```
INSERT SCRAP: Chart Labels
```

Purpose

To insert deleted charts or labels from the scrap.

Remarks

See following pages for details.

Insert Scrap Chart

Chart menu

```
INSERT SCRAP CHART in box #:
```

Purpose

To insert a chart from the scrap into the box you specify.

Remarks

The chart in the scrap is the last chart that you deleted with the Delete command. If there is no chart in the scrap, this command has no effect. See the Delete and Transfer Clear Scrap commands for information on the scrap.

Boxes are created with the Split command.

Enter the number of the box where you want the new chart. Boxes are numbered left to right and top to bottom, beginning with the upper left box.

Insert Scrap Labels

Chart menu

```
INSERT SCRAP LABELS:
```

Purpose

To insert all labels in the scrap into the charts they came from.

Remarks

See the Delete and Transfer Clear Scrap commands for information on the scrap.

List

Entry, Chart menus

```
COMMAND: Analyze Chart Entry Format Gallery Help Include
         Modify Name Options Print Quit Transfer Xternal
```

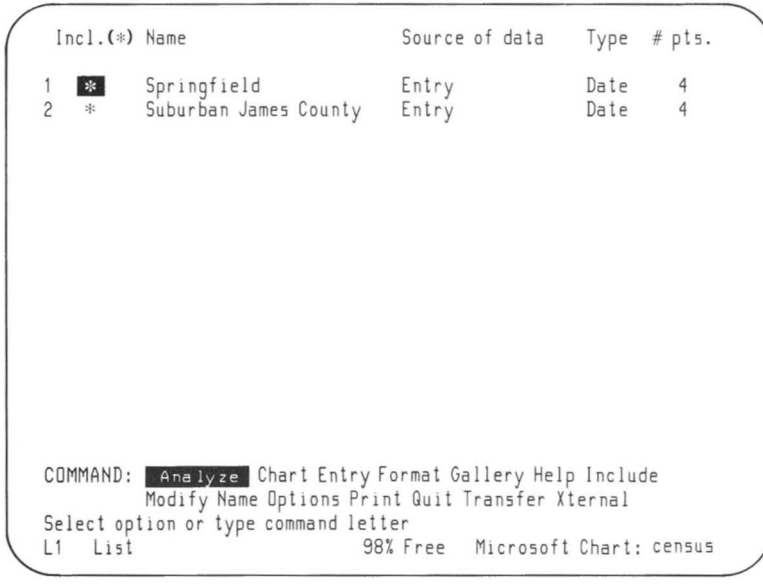
Purpose

To display a list of all data series currently in Chart's internal memory, descriptive information for each data series, and the List menu of commands.

Remarks

In the List, each line represents one entire data series. You can add new series to the List from other files on disk with Transfer Merge; replace current series in the list with Transfer Load; create new series with Modify Insert, Modify Copy, Name, Analyze; reorder series with Modify Move; delete series with Modify Delete; and include or exclude the series from the chart with Include.

The List screen looks like this:


Incl.(*) Name Source of data Type # pts.
1 * Springfield Entry Date 4
2 * Suburban James County Entry Date 4
COMMAND: Analyze Chart Entry Format Gallery Help Include
Modify Name Options Print Quit Transfer Xternal
Select option or type command letter
L1 List 98% Free Microsoft Chart: census

Column:	Tells you:
Line number	The line number of the selected series appears in the lower left corner of the screen. You refer to series by line number in many commands from the List menu.
Incl.	Whether a series will be included in the chart. An asterisk (*) means that the data series will be included in the chart (see the Chart and Gallery commands). A hyphen (-) means the data series will not be included in the chart. See "Including and Excluding Data Series from a Chart" in Chapter 5.

Column:	Tells you:
Name	The name of the data series assigned with the Name command.
Source of data	Where the data in the series came from. The following examples illustrate typical entries in this column: "Entry" indicates that you entered the series from the keyboard. "Trend of 3" indicates that you used the Analyze Trend command to calculate the series from data in the series listed on line 3 of the List screen. "File" followed by a filename and external reference indicates that the series contains data copied (with an Xternal command) from another application program. The same entry preceded by "Linked to" indicates that the series is linked to the external file data was copied from.
Type	Whether the categories are dates (Date), sequential numbers (Sequence), words (Text), or unordered numbers (Number). See the Name command for details.
# of pts.	The number of data points in the series.

Modify

List menu

```
MODIFY: Append Copy Delete Insert Move
```

Entry menu

```
MODIFY: Combine Delete Insert Move
```

Purpose

To add, delete, or move entire lines. On the List screen, a line represents an entire data series; on the Entry screen, a line contains one data point. See the following pages for details.

Modify Append

List menu

```
MODIFY APPEND series in line:      to series in line:
```

Purpose

To append all the values from one series to another series.

Remarks

The first series is not changed; the second series, though, may be changed. For Text and Number series, the appended values have their original categories. For Date and Sequence series, the appended values receive newly calculated categories. See the Name command for information on category types. The types must match.

Command Fields

series in line:

Enter the line number of the series containing the values you want to append. The proposed response is the line number of the selected series. Either type the number or use the direction keys to highlight the line you want. As you press the direction keys, the highlighted line number appears in this field.

to series in line:

Enter the line number of the series you want to append the values to. Either type the line number or use the direction keys to highlight the series.

Modify Combine

Entry menu

```
MODIFY COMBINE # of points:          starting at line:
```

Purpose

To replace the specified data points with a single data point.

Remarks

You can only combine consecutive data points. The value of the new data point will be the sum of the values of the specified data points. This is especially useful for simplifying pie charts with too many data points.

The category depends on the type of series:

Date	The date of the first of the combined data points
Number	The sum of the category numbers
Sequence	The sequence number of the first of the combined data points
Text	Blank

Command Fields

# of points:

Enter the number of data points to combine.

starting at line:

Enter the line number of the first data point that you want to combine. Either type the number or use the direction keys to highlight the line you want. When you highlight a line, the corresponding line number appears in this field.

Modify Copy

List menu

```
MODIFY COPY series in line:
```

Purpose

To make an exact copy of the specified series.

Remarks

In the "Incl." column, the new series will have the same symbol (* or -) as the original, its name will be the name of the original series preceded by "Copy of," and "Copy" will be in the "Source of data" column. The new series will not be linked to any other series or file even if the original series was.

Command Fields

series in line:

Enter the line number of the series you want to copy. Either type the number or use the direction keys to highlight the line you want. When you highlight a line, the corresponding line number appears in this field.

Modify Delete

List menu

```
MODIFY DELETE # of series:        starting at line:
```

Entry menu

```
MODIFY DELETE # of points:        starting at line:
```

Purpose

To delete the specified series from the List or the specified data points from the series.

Remarks

When applied to a data series, this command requires confirmation. After you press the RETURN key, the message "Enter Y to confirm" appears.

If you type *Y*, Chart deletes the series. Pressing any other key cancels the command.

Command Fields

# of series:
# of points:

Enter the number of data series or data points to delete.

starting at line:

Enter the line number of the first series or data point you want to delete. Either type the number or use the direction keys to highlight the line you want. When you highlight a line, the corresponding line number appears in this field.

Modify Insert

List menu

```
MODIFY INSERT # of series:          before line:
```

Entry menu

```
MODIFY INSERT # of points:          before line:
```

Purpose

To insert the specified number of series or data points above the specified line.

Remarks

You can specify one or more series or points. The new series or points are inserted above the line specified in the "before line" field.

Command Fields

# of series:
# of points:

Enter the number of data series or data points to insert.

before line:

Chart will insert the series or data points above the line number entered here. Either type the number or use the direction keys to highlight the line you want. When you highlight a line, the corresponding line number appears in the field.

To add series or points to the end of the List or series, enter any number in this field that is higher than the last line number.

Modify Move

List menu

```
MODIFY MOVE from line:   to before line:     # of series:
```

Entry menu

```
MODIFY MOVE from line:   to before line:     # of points:
```

Purpose

To rearrange the order of the series in the List or the data points in the series.

Command Fields

from line:

Enter the line number of the first series or data point you want to move. Either type the number or use the direction keys to highlight the line you want. When you highlight a line, the corresponding line number appears in the field.

to before line:

Enter a line number or use direction keys to highlight a line. Chart will move the series or data points above the line number entered here. To move the series or points to the end of the List or series, enter a number higher than the last line number.

# of series:
# of points:

Enter the number of series or data points you want to move.

Move

Chart menu

```
MOVE to position:                    : Auto Set
```

Purpose

To move the selected object to another place on the chart.

Remarks

This command applies only to objects with frames:

Entire charts
Legends
Labels
Axes (the plot area)

A chart may be moved to any location on the screen. Any other object may be moved anywhere within the chart's frame.

Command Fields

to position: **:Auto Set**

Enter a position in coordinates or use the direction keys to move an outline of the object to where you want it.

When this field is highlighted, the direction keys move an outline of the selected object. As the outline moves, coordinates describing the pointer's position appear in the position field.

You can also type in the coordinates directly. Coordinates are in the form YnnXnn where Y0X0 is the lower left corner of the screen or paper. You choose whether the unit is inches or centimeters by your response in the "unit" field of the Options command.

Auto means that Chart will move the frame as necessary to accommodate changes in other chart objects.

Figure 9.4 shows screen coordinates for the four corners of a one-inch or one-centimeter square in the lower left corner of the screen or paper.

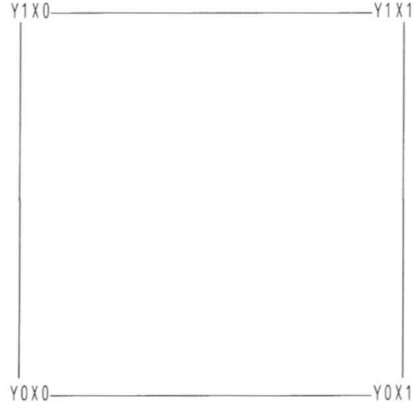


Figure 9.4. Screen Coordinates

Name

List, Entry menus

```
NAME define series name:
          category name:                    value name:
          category type: Date Number Sequence Text
          category start:                    increment:
          increment period: Day Month Weekday Year
```

Purpose

To assign series, category, and value names; and to specify the category type and the information related to the categories of the selected series.

Remarks

Changing the category type could result in loss of the contents of the category column. If you change the category type, you will have to confirm the command by typing *Y* for Yes.

Command Fields

define series name:
category name:
value name:

Enter names for the series as a whole, the category column, and the value column. The series name may appear as an entry in the legend or as a data series label.

If this is the first included series in the List, these names appear as the chart title, category axis label, and value axis label respectively. You can leave any of these fields blank.

To change the chart title without changing a series name, select the title and edit it with the Alpha command.

category type:

Choose one of the following:

Date — Chart calculates a date for each category. You can select and edit values. The responses in the last three fields (listed later in this section) determine details of the dates and how they are calculated. A date has five parts: month, day, year, quarter, and day of the week. The Format Category command controls what parts of the date show and whether they appear in long, medium, or short form.

Sequence — The program calculates a number for each category. The responses in the "category start" and "increment" fields determine how the numbers are calculated. The Format Category command controls how the sequence numbers appear (as integers, dollars, percentages, and so on).

Number — You enter individual numbers in the category column. The numbers do not have to be in a particular sequence, and you can enter the same number in more than one category. You would usually chart this kind of series with a scatter chart.

Text — You enter text in the category column.

category start:

If the category type is Sequence, type a number for the first category. The number may be negative.

If the category type is Date and you entered a date when you started DOS, that date will be the proposed response. You can type a date other than the proposed response in any of these forms:

Full dates:

2-11-1983
2/11/1983
February 11, 1983
February 11 1983
Feb. 11, 1983
Feb. 11 1983
Feb 11, 1983
Feb 11 1983
11 February 1983
11 Feb. 1983
11 Feb 1983

Partial dates:

A year (one to four digits). Chart will assume January 1.

A month (may be abbreviated as above). Chart will assume the first day of the month in the current year.

A month (any form) and a day (one or two digits). Chart will assume the current year.

A month (any form) and a year (two to four digits). Chart will assume the first day of the month.

See the Format Category command for information on controlling which parts of the date will show.

increment:

Enter a positive or negative number. For a Sequence series, each category is equal to the previous category plus this number. For a Date series, this number tells how many periods to advance the date for each category. The period is determined in the next field.

increment period:

Choose *Day*, *Month*, *Weekday*, or *Year*. The choice in this field has an effect in Date series only. *Weekday* means Monday through Friday only; *Day* includes Saturday and Sunday.

Note

In a Date series, to advance the date by quarters, enter *3* in the "increment" field and *Month* in the "increment period" field.

Options

All menus

```
OPTIONS redraw chart:Yes No  display:Screen Device
        invert screen:Yes No  mute:Yes No  unit:Cm Inch
```

Purpose

This command sets several options that affect the operation of Chart and proposed responses in certain command fields.

Remarks

After you carry out this command by pressing the RETURN key, the message line shows the version number of the program and the total number of bytes of memory available for your work. The status line shows the percentage of available space remaining for your work (for example, "100% Free"). Also see the Transfer Options command.

Command Fields

redraw chart:

The chart is redrawn each time you make a change or when any part of the chart has been obscured by a command menu, even if you cancel the command. To stop redraw, choose *No*. Changes you make to the chart will then be shown only when you press the REDRAW key.

display:

Choose an option. The choice determines whether measurements given in the Format Size, Format Type, and Move commands are accurate for the screen or for the device specified in the "device" field of the Print Setup command. See Chapter 8, "Saving and Printing Charts," for details.

invert screen:

No means the background will be white; *Yes* means it will be black. *Yes* reverses the sense of black and white. Any part of an object whose color is black will be shown in white on the screen. The white pattern will be shown as black on the screen.

mute:

Normally you will hear a beep when an error occurs. *Yes* means that the beep will not sound.

unit:

This field determines whether numbers you enter in command fields requiring a measurement of distance or size will be interpreted as inches or centimeters.

Cm = centimeters

Inch = inches

Print

All menus

```
PRINT: Printer File Options Setup
```

Purpose

To specify the device for which charts will be designed. To print the List, the contents of a data series, or a chart on a printer, plotter, film device, or into a file. To review or to set options that control the size, position, orientation, and printing of a chart on a graphics device.

Remarks

See the following pages; Chapter 8, "Saving and Printing Charts"; and the topic "Printers and Plotters" in "Operating Information" for more information on printing charts.

Print File

All menus

```
PRINT FILE name:
```

Purpose

To save a printer version of the List, data series, or chart in a file for later printing without using Chart.

Remarks

The Print File command uses the responses in the Print Options and Print Setup commands to save a printer version of the List, data series, or chart in a file. You can print the saved file by copying it directly to the printer or plotter.

In the List and Entry menus, Chart prints the List or data series in the same format as that which appears on the screen. The entire List or series is printed even if it will not fit on one screen. Chart assumes the printer is able to print standard text files.

Pressing CANCEL causes Chart to pause and to display the message "Enter Y to continue". Pressing CANCEL again cancels printing and returns you to the main command menu. The partial file that has been created will be deleted.

The device specified in the "device" field of the Print Setup command determines the format of the print file. You can later print this file using the disk operating system COPY command or a print utility. The Print File command cannot be used if either *Screen* or *Polaroid* has been selected in the "device" field of the Print Setup command.

If the device is a plotter, the copy or print utility you use to print the print file will not be able to prompt you to change pens. If your plotter has the ability to pause and wait for operator action, Chart will place pause instructions into the print file at each place where a manual pen change is required.

Command Fields

name:

Enter a filename. You should not use the name of any existing file. Special extensions (such as .PRN) after the filename can help remind you of the file contents.

Print Options

Chart menu

If you are using a printer, you will see the following set of command fields:

```
PRINT OPTIONS page length top:          left:
              page margin top:         left:
              display area orientation: Horizontal Vertical
              display area width:   height:    :Auto Set
              # of copies:
```

If you are using a plotter, you will see the following two command fields added to the above set:

```
pen speed: Fast Slow      pen size:
```

In addition to printing charts on a printer or plotter, you can print charts with various film devices. Some of these devices allow for horizontal or vertical orientation of charts on the prints or slides you make. If you are printing with such a device, you will see the following set of command fields:

```
PRINT OPTIONS film type:
 display area orientation: Horizontal Vertical
# of copies:
```

Purpose

To review or to set options that control the size, position, orientation, and printing of the chart on a graphics device.

Remarks

Fill in the command fields appropriate for the device you've specified in the "device" field of the Print Setup command.

If you are printing with a film device that does not allow for horizontal or vertical orientation of charts, you will see the following set of command fields:

```
PRINT OPTIONS film type:
   modify exposure: Lighten Darken
   by percentage:    # of copies:
```

Command Fields

(for printing on a printer)

page length top:

Enter the length of the top edge of the usable area of the paper in inches or centimeters. The length of the top edge for printers is measured perpendicular to the direction of paper feed.

left:

Enter the length of the left edge of the usable area of the paper in inches or centimeters. The length of the left edge for printers is measured parallel to the direction of paper feed.

page margin top:

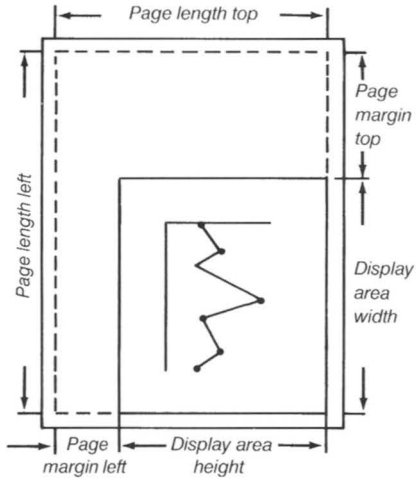
Enter a measurement for the distance you want from the top edge of the page to the top edge of the chart display area.

left:

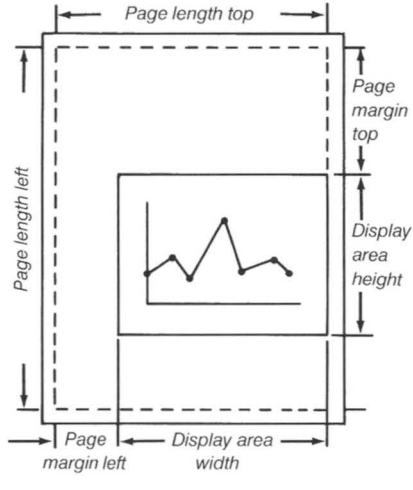
Enter a measurement for the distance you want from the left edge of the page to the left edge of the chart display area.

display area orientation:

Choose Horizontal to place the left edge of the chart display area parallel to the top edge of the paper. Choose Vertical to place the left edge of the chart display area parallel to the left edge of the paper.



Horizontal



Vertical

Figure 9.5. Horizontal and Vertical Display Area Orientation

display area width: height: :Auto Set

Enter the measurements you want for the width and height of the chart display area, the area on the paper that will be used to display the chart.

The Auto-Set field applies to both fields together. *Auto* means that Chart will adjust the size of the display area to be the largest rectangle that fits on the page within the specified margins, while maintaining the 9 to 5 width-to-height ratio of the chart as displayed on the Chart screen. If you set the width and height, the chart will expand to completely fill the display area you specify. See Chapter 8, "Saving and Printing Charts," for details.

# of copies:

Type the number of copies you want to print.

Command Fields

(for printing with a plotter)

In addition to the command fields described above, you need to fill in the following two fields:

pen speed: Fast Slow

Choose Fast for plotting on paper. Choose Slow for plotting on transparencies. Slow speed may also be useful when using old or dried-out pens.

pen size:

Enter the size of the plotter's pen in millimeters. The proposed response if the thickness of the manufacturer's standard pens.

Note

When filling in the "page length top" and "left" fields, note the following: For plotters, the length of the top edge of the usable area of the paper is the length of the shorter edge of the paper; the length of the left edge is the length of the longer edge of the paper.

Command Fields
(for printing with a film device)

The following command fields apply to film devices that allow for horizontal or vertical orientation of charts on the prints or slides you make:

film type:

Type the name of the film you are using (for example, *Ektachrome* or *Polachrome 669*), or press the LEFT or RIGHT key to step through a list.

display area orientation: Horizontal Vertical

Choose either *Horizontal* or *Vertical.*

# of copies:

Type the number of copies you want to print.

The following command fields apply to film devices that do not allow for horizontal or vertical orientation of charts on the prints or slides you make:

film type:

Type the name of the film you are using (for example, *Ektachrome* or *Polachrome 669*), or press the LEFT or RIGHT key to step through a list.

modify exposure: Lighten Darken

Choose *Lighten* to lighten the exposure by the percentage you enter in the "by percentage" field. Choose *Darken* to darken the exposure.

by percentage:

Type a number representing the percentage by which you want to either lighten or darken the current exposure.

# of copies:

Type the number of copies you want to print.

Print Printer

All menus

PRINT PRINTER:

Purpose

To print the List or data series on a printer, or the chart on a printer or plotter.

Remarks

The Print Printer command uses the responses in the Print Options command to print the List, data series, or chart.

In the List and Entry menus, the List or data series is printed in the same format as that which appears on the screen. The entire List or series is printed even if it does not fit on one screen. Chart assumes the printer is able to print standard text files.

The chart is printed on the device specified in the Print Setup command. If the device specified is *Screen,* the Print Printer command will result in the error message "Not a valid print device."

To cancel printing, press the CANCEL key. If a printer error occurs during printing, Chart displays the "Printer error" message.

Print Setup

All menus

```
PRINT SETUP device:              adapter:
```

Purpose

To specify the graphics print device you are using.

Remarks

In fields of commands that control colors, patterns, marker types, and fonts, both the automatic settings and the lists of choices that you can view with the direction keys are based on the available features of the device you've specified in the "device" field.

See Chapter 8, "Saving and Printing Charts," for details.

Command Fields

device:

Use the direction keys to enter the name of the graphics device you are using. The response in this field may be either Screen or the name of a printer, plotter, or film device. If you enter the name of a printer, plotter, or film device, the Print Printer and Print File commands will print the chart to the specified device or file.

Note

For certain devices, the Print Printer and Print File commands do not apply. For example, when using the Polaroid Palette, you will never print a chart to a file.

---

adapter:

Enter the name of the parallel adapter (LPT1:, LPT2:, or LPT3:) that connects to your graphics device. If you leave this field blank, Chart assumes LPT1:. The colon following the name is optional.

If you connect a serial device to a computer via a serial adapter, you must establish a protocol to regulate communication between the computer and the device. See "Printers and Plotters" in "Operating Information" for details.

The adapter name you give in the List or Entry menu may be different from the adapter name you give in the Chart menu. If you have both a printer and a plotter, you can specify that List and Entry data should be printed on the printer, and that charts should be printed on the plotter.

Quit

All menus

```
QUIT:
```

Purpose

To end a charting session.

Remarks

You must type *Y* to confirm this command. When you do, Chart terminates and returns you to DOS. Pressing any other key cancels the command and returns you to the main menu.

Chart does not automatically save a chart's data and format on the disk. If you want to save any of the data or the format, use the Transfer Save command before choosing Quit.

Chart does save the responses in all the fields of the Options, Print Options, and Transfer Options commands. A file called MC.INI is created on the Chart Program disk to store this information. The next time you run Chart, all option field responses will be as you left them in this charting session.

Range
(Category Axis Selected)

Chart menu

```
RANGE axis crosses at category #:        maximum:Yes No
  reverse:Yes No  between points:Yes No  label interval:
```

Purpose

To control the point on the category axis at which the value axis crosses. To control labeling of the category axis and the direction of its scale.

Remarks

This command applies to the selected category axis for all types of charts except a scatter chart. For scatter charts, see the Format Range command (value axis selected). To format tick marks and tick mark labels, see the Format Type command (axis selected).

Command Fields

crosses at category #:

Enter the number of the category at which the value axis crosses. Unless the chart is reversed (see explanation later in this section), the first category is the one at the left, if the category axis is horizontal, or at the bottom, if the category axis is vertical.

maximum:

Choosing *Yes* means the value axis will cross the category axis at or just beyond the last category. This response overrides the response in the "crosses at category #" field.

reverse:

No means the values increase from left to right or from bottom to top. *Yes* means the values will increase from right to left or from top to bottom.

between points:

Choosing *Yes* means the value axis and category axis tick marks will fall between the categories; *No* means they will cross the categories.

label interval:

Typing *1*, means label every category, typing *2* means label every second category, and so on. This is especially useful when the tick mark labels are long or if you have a large number of data points.

Range
(Value Axis Selected)

Chart menu

```
RANGE minimum value:                  : Auto Set
      maximum value:                  : Auto Set
         major unit:                  : Auto Set
         minor unit:                  : Auto Set
        axis crosses:                 : Auto Set
  logarithmic scale: Yes No          reversed: Yes No
```

Purpose

To control the range of values displayed on the value axis and how the scale is formatted.

Remarks

The value axis must be selected in all types of charts except a scatter chart. In a scatter chart, you can also select the category axis. See the Format Range command (category axis selected).

Note

Negative values cannot be represented meaningfully in pie charts, stacked charts (including area charts), 100% charts, and charts with logarithmic scales. Chart does the best it can with negative data in these cases, but the results should not be interpreted as correct.

Command Fields

minimum value: **:Auto Set**

Enter the lowest value that you want to appear on the scale of the axis. Values below the minimum will not appear on the chart. *Auto* means that the minimum value on the scale will be either zero or the lowest value rounded down to the next major unit, whichever is lowest. The minimum value must be less than the maximum value you specify in the next field.

maximum value: **:Auto Set**

Enter the highest value you want to appear on the scale of the axis. Values above the maximum will not appear on the chart. *Auto* means that the maximum value on the scale will be the highest value in all included series rounded up to the next major unit. The maximum value must be greater than the minimum value you specify in the previous field.

major interval: **:Auto Set**

Enter the increment between major tick marks. *Auto* means that Chart chooses a reasonable major interval. If you enter a value, it must be greater than zero and less than the difference between the responses in the "maximum value" and "minimum value" fields above.

minor interval: **:Auto Set**

Enter the increment between minor tick marks. *Auto* means that the program chooses a reasonable minor interval. If you enter a value, it must be greater than zero and less than the response in the "major interval" field above.

axis crosses: **:Auto Set**

Enter the value at which the category axis crosses. It must be between the values specified in the "minimum value" and "maximum value" fields above.

logarithmic scale:

Choose *Yes* for a logarithmic scale. This affects the other fields as follows:

Field	Effect
minimum value	*Auto* means the minimum value will be the largest power of ten smaller than the lowest data point. If there is no such data point, it will be one.
maximum value	*Auto* means the maximum value will be the smallest power of ten larger than the highest value. If the highest value is less than or equal to zero, it will be one.
major interval	Must be a power of ten.
minor interval	On a logarithmic scale, the minor interval field chooses between two styles of minor intervals. If the response in the field is *Auto*, or if you enter *1* in the field, there will be eight minor intervals between major intervals, corresponding to the logarithms of 2, 3, 4, 5, 6, 7, 8, and 9. If you enter a value other than 1, there will be just one minor interval between major intervals, corresponding to the logarithm of 5.

reversed:

No means the values increase from left to right or from bottom to top. *Yes* means the values will increase from right to left or from top to bottom.

Sort

Entry menu

```
SORT by: Category Value    order: >< 
```

Purpose

To arrange the data points in a series in either ascending or descending order of categories or values.

Remarks

In unordered series (Text and Number), data points are treated as wholes: corresponding values and categories stay together.

In ordered series (Date and Sequence), sorting by values changes the correspondence between values and categories.

Command Fields

by:

Choose *Category* to sort the data points according to the contents of the category column; choose *Value* to sort according to the values.

order:

Choose > for ascending, < for descending. The ascending order is:

```
! " # $ % & ' ( ) * + , - . /
0 1 2 3 4 5 6 7 8 9 : ;< = > ? @
A B C D E F G H I J K L M N O P Q R S T U V
W X Y Z [ \ ^ _ `
a b c d e f g h i j k l m n o p q r s t u v
w x y z { | }
```

A Date or Sequence series is, by nature, sorted: if the response in the "increment" field of the Name command is positive, it is ascending; if the response is negative, it is descending. For either of these types, sorting by category in the opposite order both reverses the order of the data points and changes the increment from positive to negative or from negative to positive. New values can then be added to the series; Chart will calculate the appropriate category.

Note

It is not necessary to sort a Date or Sequence series to reverse the scale on the axis. See the "reverse" field in the Range commands (category axis and value axis selected).

Split

Chart menu

```
SPLIT display into # of rows:     # of columns:
      current chart in box #:     show borders:Yes No
```

Purpose

To split the display into a number of areas or boxes before inserting new charts. You can also use the Split command to move the current chart from one box to another, to change the number of boxes in the display, and to unsplit the display.

Command Fields

# of rows:
# of columns:

Enter the number of rows and the number of columns for the screen layout. You can have up to four rows and four columns.

current chart in box #:

Enter the number of the box with the current chart. The boxes are numbered from left to right starting in the upper left corner. Changing the response in this field moves the current chart to a different box. The current chart is indicated in the lower left corner of the screen.

show borders:

If you choose *Yes*, borders will separate the boxes; box numbers will appear in the upper left corner of each box. Chart will print both boxes and box numbers. If you choose *No*, neither borders nor box numbers will appear.

Transfer

All menus

```
TRANSFER: Load Save Clear Delete Merge Options
```

Purpose

To move information between Chart's memory and a disk, and to erase information from Chart's memory or a disk.

Remarks

Data and format can be moved or erased independently. See the following pages for details.

Transfer Clear

All menus

```
TRANSFER CLEAR: All Data Format Scrap
```

Purpose

To erase information from Chart.

Transfer Clear All

All menus

```
TRANSFER CLEAR ALL:
```

Purpose

To erase all information from Chart.

Remarks

Typing *Y* completes the command; pressing any other key cancels the command and returns you to the main command menu.

Transfer Clear Data

All menus

```
TRANSFER CLEAR DATA:
```

Purpose

To erase all data series from the List.

Remarks

Because data will be destroyed, you must confirm this command by typing *Y* for Yes. Pressing any other key cancels the command and returns you to the main command menu.

Chart format is not affected.

Transfer Clear Format

All menus

```
TRANSFER CLEAR FORMAT:
```

Purpose

To erase the Chart format you chose with the Gallery, Format, Range, Move, and Split commands.

Remarks

Because formatting information will be lost, you must type *Y* to confirm this command. Pressing any other key cancels the command and returns you to the main command menu.

This command resets the chart format to a simple column chart, but does not affect the data or data format on the Entry screen.

Transfer Clear Scrap

All menus

```
TRANSFER CLEAR SCRAP:
```

Purpose

To erase the contents of the scrap.

Remarks

The scrap contains labels and the most recent chart you deleted during the current session with the Delete command. Because these will be lost, you must confirm this command by typing *Y* for Yes. Pressing any other key cancels the command and returns you to the main command menu.

Once cleared from the scrap, the chart and labels are not recoverable. This command does not affect the data, data format, or chart format.

Transfer Delete

All menus

```
TRANSFER DELETE filename:
```

Purpose

To erase a file from the disk.

Remarks

Because the information in the file will be lost, you must confirm this command by typing *Y* for Yes. Pressing any other key cancels the command and returns you to the main command menu.

Command Fields

filename:

Enter the name of a file you want to delete from the disk. Pressing any direction key shows a list of all files on the disk; see the explanation under the Transfer Load command.

Transfer Load

All menus

```
TRANSFER LOAD filename:
                    load: All Data Format
```

Purpose

To load the specified information from a file on the disk into Chart, replacing the current information. With this command you can:

- Load new data and format
- Load new data, keeping the current format
- Load a saved format, applying it to existing data

The latter allows you to reuse your favorite custom Chart formats.

Remarks

This command loads information from Chart files and from SYLK files created by other application programs.

To add to, rather than replace, the data series already in the List, see the Transfer Merge command.

Command Fields

filename:

Enter the name of the file on the disk from which you want to load information into Chart. You can either type the name or use the direction keys to display and choose from a list of files on the disk, as described below.

When you do not type anything in the "filename" field and, instead, press a direction key, a complete list of all files on the disk or in the current directory appears on the screen. Use the direction keys to choose a file and then press the TAB key to go to the next field or the RETURN key to carry out the command.

You can use the wild card character (*) when entering a name in the "filename" field. For example, if you enter *.*MC*, when you press a direction key, a list of all files on the disk or current directory ending with .MC appears on the screen. Choose a file and continue as described in the previous paragraph. If you enter a single asterisk (*) in the field, the list will show only those files that do not have an extension (such as .BAS). If there are more files on the disk than can be displayed on one screen, you can scroll the list with the DOWN, UP, PAGE DOWN, PAGE UP, HOME, and END keys.

load:

Choose one of the following:

All — Both the data and the format are loaded from the file. The data series replaces the current data series in the List; the format from the file replaces the current format. Data files from other software programs in SYLK format have no Chart format, so loading them clears the current format.

Data — The new data series replace data series already in the List. Data series are included (*) or are excluded (-) the same way they were when previously saved.

Format — Only the new chart format is loaded, replacing the current chart format. Data series on the List are not affected. Data files from other software programs in SYLK format have no Chart format, so loading them also clears the current chart format.

You will probably want to use the Name command on data series loaded from other programs. Data will be loaded, but "categories name" and "values name" fields in the Name command will often require additional specification or editing. The values will not be formatted.

Transfer Merge

All menus

```
TRANSFER MERGE filename:
                merge: All Data
```

Purpose

To merge the specified information from a file on disk into Chart, adding it to the List. To replace the current Chart format with a previously saved format.

Remarks

This command merges information from Chart files as well as files created by other software programs.

Transfer Merge always adds data to the list. If you select *All* (see below), the current chart format is also replaced. Transfer Load always replaces something, depending on which option you choose in the "load" field.

Command Fields

filename:

Enter the name of the file on the disk from which you want to merge information into the program. You can either type the name or use the direction keys to display and choose from a list of files on the disk as described below.

When you do not type anything in the "filename" field and instead press a direction key, a complete list of all files on the disk or in the current directory appears on the screen. Use the direction keys to choose a file, and then press the TAB key to go to the next field or the RETURN key to carry out the command.

You can use the wild card character (*) when entering a name in the "filename" field. For example, if you enter *.*MC* when you press a direction key, a list of all files on the disk or current directory ending with .MC appears on the screen. Choose a file and continue as described above. If you enter a single asterisk (*) in the field, the list will show only those files that do not have an extension (such as .BAS).

If there are more files on the disk than can be displayed on one screen, you can scroll the list with the UP, DOWN, PAGE UP, PAGE DOWN, HOME , and END keys.

merge:

Choose one of the following:

All	The chart format of the new filename replaces the current chart format. The new data series are added to the current list of data series.
Data	The new data series are added to the current list of data series. The current chart format is unchanged.

In both cases, the new data series are marked for inclusion (*) or exclusion (-) the way they were marked when previously saved, and the current data series are marked for exclusion (-).

You will probably want to use the Name command on data series loaded from other programs. Data will be merged, but "categories name" and "values name" fields in the Name command will often require additional specification or editing. The data will not be formatted.

Transfer Options

All menus

```
TRANSFER OPTIONS mode: Normal Symbolic      setup:
```

Purpose

To change the format in which Chart stores files, and the disk drive that will be current for all future Transfer Load, Transfer Save, Transfer Delete, Print to File, and Xternal commands.

Command Fields

mode:

Choose either *Normal* or *Symbolic*. Symbolic mode is used for saving information in symbolic Link (SYLK) file format to make it accessible to other productivity programs.

setup:

Enter a drive specification, a directory name, or both. The response in this field affects all future Transfer Load, Transfer Merge, Transfer Save, Transfer Delete, Print to File, and Xternal commands. Information will be loaded from and saved to the drive and/or directory entered here.

Transfer Save

All menus

```
TRANSFER SAVE filename:
                    mode: Normal Symbolic
```

Purpose

To save all the information in Chart as a file on the disk.

Remarks

You can later load the entire file, its data, or its format with the Transfer Load command. The file or just its data can later be loaded with the Transfer Merge command.

Command Fields

filename:

Type a name for the file on the disk.

The proposed name for the disk file is the name you last gave with the Transfer Save command, or the name last loaded with Transfer Load or Transfer Merge.

If the filename is a duplicate of one that exists on the disk already, the message "Enter Y to overwrite file" appears when you press the RETURN key. Type *Y* to replace the file on disk with the current information in Chart. Pressing any other key cancels the Transfer Save command.

mode:

Choose either *Normal* or *Symbolic*. Chart takes the proposed response from the "mode" field in the Transfer Options command. This field allows you to change the mode for this operation only.

Value

Entry menu

ALPHA/VALUE:

Purpose

To enter and edit text or numbers in the category and value columns on the Entry screen.

Remarks

If the selected category, value, or label already contains information, that information is the proposed response in the command field. You can edit this response by typing; when you begin typing, the proposed response is replaced entirely.

When the main command menu on the Entry screen is showing and you type any numeral, a plus sign (+), a minus sign (-), a decimal point (.), a double quotation mark ("), or an equal sign (=), Chart assumes you want to enter a value and goes to the Value command.

After you type or edit the response, you can enter it into the category or value column by pressing either the RETURN key or any of the direction keys (RIGHT, LEFT, UP, DOWN). The RETURN key places what you typed into the selected category or value and returns you to the main menu. The direction keys place what you typed into the selected category or value, select the next category or value, and continue in the Value command so you can enter more information.

If the message asks for text, you can type any combination of letters, numbers, punctuation, and special symbols.

If the message asks for a value, type a number. You can use the percent sign (%), the plus sign (+), the minus sign (-), the decimal point (.), and, in scientific notation, "E". See "Scientific Notation" under "Entering Data from the Entry Screen" in Chapter 5. Do not use any other non-numeric characters, including commas.

Because Chart calculates dates and sequence numbers for you in Date and Sequence series, you can only select values in these types of series.

Xternal

List menu

```
EXTERNAL: Multiplan Lotus dBASE SYLK/DIF Text
```

Purpose

To copy data from files created by other application programs.

Remarks

Different application programs use different formats to store information, making it difficult to copy information produced by one program directly into another. The External command converts these formats into one that can be used by Chart.

The External command works with the following types of files:

- Multiplan Files
- Lotus 1-2-3 *(.wks)* and Lotus Symphony *(.wrk)* Files
- dBASE II and dBASE III (Symbolic Data Format) Text Files: Delimited Text files that use the single close quote character (') as a text quote character and the comma (,) as a field delimiter
- SYLK (Microsoft Symbolic Link Format) Files
- DIF (Data Interchange Format) Files
- Text Files stored in the following formats:

  Columnar: ASCII text files organized into columns. Most spreadsheet programs produce columnar text files when they are printed to a file.

Delimited: ASCII text files with fields separated by some kind of "delimiter" or marker, such as a comma or tab character. They may also use a special quote character to enclose text within fields.

Regardless of which External subcommand you use, you copy data to Chart by following these basic steps:

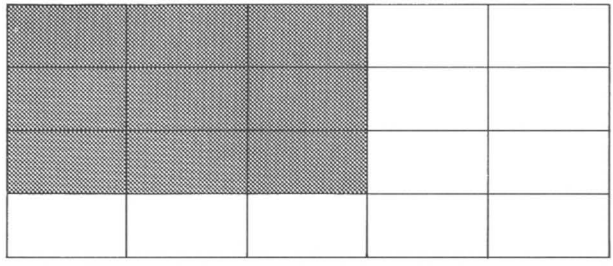
- Name the file you want to copy data from.
- Tell Chart whether or not to link the Chart file you create to its source.
- Identify the data you want to copy.
- Tell Chart how to divide the data you copy into data series.
- Tell Chart which data to use as series labels and category labels on the chart you make.

You should link the Chart file you create to its source if you plan to update or revise data in the source file between charting sessions. Once you've revised the source file, Chart will automatically copy the revised data to the Chart file the next time you load it.

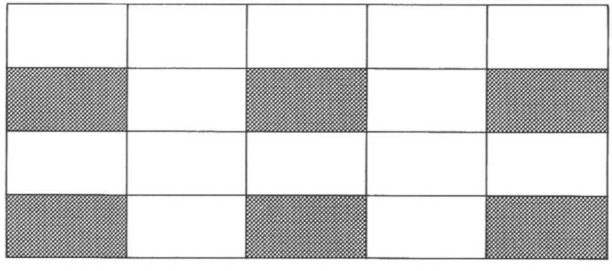
If you link your Chart file to its source, you cannot edit the data in the Chart file; Chart assumes that, instead, you will edit the data in the source file. You can, however, edit the data in any unlinked Chart file.

To remove the link between a Chart file and its source, select the linked series on the List screen. Then choose the External command and change the response in the "linked" field from *Yes* to *No*.

Any data copied from a source file must form a rectangular area within the file. For example, you can identify a rectangular area composed of adjoining rows and columns, as represented by the shaded area in the following diagram:

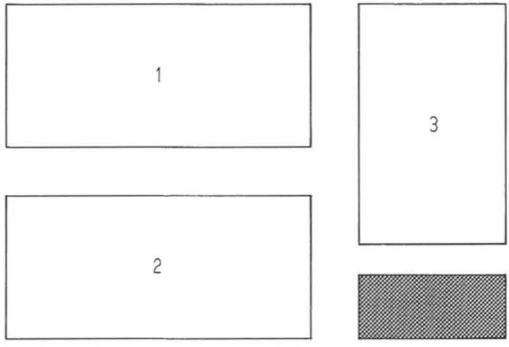


You can also copy more than one area, as represented by the shaded areas below:



When you copy nonadjoining areas, Chart treats them as a single rectangular block of data. Areas between the data you copy are not reflected in any chart you make.

If any nonadjoining areas you copy do not collectively form a rectangular area, Chart will copy as much additional data as necessary to fill the rectangle. For example, if you copy the areas labeled 1, 2, and 3 below, Chart will also copy the shaded area:



When you copy data from another file, the structure of the resulting chart depends upon whether you orient series by rows or by columns. For example, consider a column chart of the data on the portion of the worksheet shown below:

	1	2	3	4
#1				
	1			
	2 Costs	$16150	$15820	$17970
	3 Revenue	$24680	$27540	$29760

Chart considers each cell on the worksheet as one data point. Before plotting the data, however, Chart needs to know if each row of values forms one data series, or if each column of values forms one data series. If you tell Chart to orient the data by rows, the resulting chart will be structured as shown below:

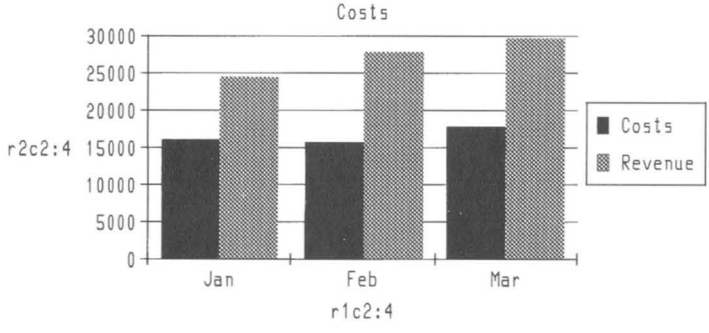


Chart clusters the columns in groups of two. The chart contains two data series, and each series contains three data points. The solid columns on the chart represent costs for January through March. The patterned columns represent revenues for the same period.

If, on the other hand, you tell Chart to orient the data on the worksheet by columns, the resulting chart will be structured like this:

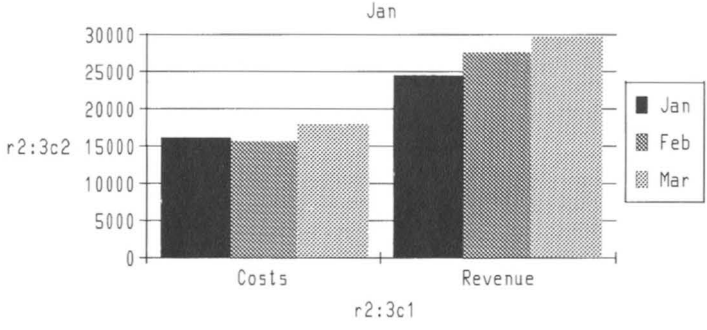


Chart clusters the columns in groups of three. The chart contains three data series, and each series contains two data points. The first cluster of columns on the chart represents costs for January through March; the second cluster represents revenues for the same period.

You determine the content of series and category labels on the chart by filling in the "series name(s) from" and "categories from" fields common to all External subcommands. Your response in the "categories from" field is keyed to whether you've oriented data series by row or by column. If you've oriented by row, Chart will take category labels from the row whose number you enter in the "category from" field, and series labels from the column whose number you enter in the "series name(s) from" field. If you've oriented by column, Chart reverses the content of the two sets of labels.

Be sure to save the Chart file you create under a different name from that of its source file. Doing so will clearly distinguish the two files from one another.

Xternal Multiplan

List menu

```
EXTERNAL MULTIPLAN filename:                linked: Yes No
       named area or reference:
       orient series by: Row Column
       series name(s) from:              categories from:
       category type: Sequence Number Text
```

Purpose

To copy files created by Multiplan.

Remarks

This command creates a new Chart file containing the data you specify in the "named area or reference" field. The structure of the resulting chart depends on your response in the "orient series by" field. For a detailed description of orienting data by row or column, see the preceding discussion of the Xternal command. See also "Copying Data from Other Application Programs" in Chapter 5, "Preparing Data for a Chart."

Command Fields

filename:

Type the name of the Multiplan file you want to copy data from, or press any direction key to display a list of filenames to select from.

linked: Yes No

Choose *Yes* to link the Chart file to its Multiplan source file. Choose *No* to make a one-time copy of data in the Multiplan source file.

named area or reference:

You can specify either the entire worksheet or one or more rectangular groups of cells within the worksheet. Leave this command field blank to copy the entire worksheet.

To copy a rectangular group of cells, type the reference to the cells. If you previously used Multiplan's Name command to name the cells, you can type the name instead of the reference.

You can specify several nonadjoining groups of cells. When you do so, separate each name or reference with a comma. The number of cell groups you can specify is limited only by the 255-character maximum length of your response.

orient series by: Row Column

Choose either *Row* or *Column*.

Your choice affects the number of data series Chart creates from the Multiplan cells you want to copy, and therefore the structure of the chart you make from the cells.

series name(s) from:

Your response in this field depends on your response in the previous field. If you've oriented series by row, type the number of the column on the Multiplan worksheet containing the data (usually text) you want to use as series labels on a chart. If you've oriented series by column, type the number of the row containing the data you want to use as series labels.

categories from:

Enter a response only if you want to use text or values from the worksheet as category labels on a chart.

If you've oriented series by row, type the number of the row on the Multiplan worksheet containing the data you want to use as category labels on a chart. If you've oriented series by column, type the number of the column containing the data you want to use as category labels.

category type: Sequence Number Text.

If you specified a row or column of values in the "categories from" field, choose *Number* in this field. Chart will consider the data it copies as number series and use the values in the row or column you specified in the "categories from" field as category labels on the chart you make. (If, within the specified row or column, a cell contains text instead of a value, Chart will label the data point's category as zero.)

Note

Typically, you'll choose *Number* if you want to plot a scatter chart of scientific data.

If you left the "categories from" field blank, accept the proposed response of *Sequence*. Chart will consider the data it copies as sequence series and use sequential numbers as category labels on the chart you make.

If you specified a row or column of text in the "categories from" field, choose *Text*. Chart will consider the data it copies as text series and use the text in the row or column you specified in the "categories from" field as category labels on the chart you make.

Xternal Lotus

List menu

```
EXTERNAL LOTUS filename:                    linked: Yes No
         type: Worksheet Graph named area or reference:
         orient series by: Row Column
         series name(s) from:        categories from:
         category type: Sequence Number Text
```

Purpose

To copy files created by Lotus 1-2-3 or Lotus Symphony.

Remarks

This command creates a new Chart file containing the data you specify in the "named area or reference" field. The structure of the resulting chart depends on your response in the "orient series by" field. For a detailed description of orienting data by row or column, see the preceding discussion of the External command. See also "Copying Data from Other Application Programs" in Chapter 5, "Preparing Data for a Chart."

Command Fields

filename:

Type the name of the Lotus file you want to copy data from, or press any direction key to display a list of filenames to select from. If you type a filename, you must add the extension *.wks* for 1-2-3 files or *.wrk* for Symphony files.

linked: Yes No

Choose *Yes* to link the Chart file to its Lotus source file. Choose *No* to make a one-time copy of data in the Lotus source file.

type: Worksheet Graph

Choose *Worksheet* to copy data directly from the Lotus worksheet. Choose *Graph* to copy a graph that you've stored with the worksheet.

named area or reference:

Leave this field blank if you want to copy the entire worksheet or the current graph from your Lotus file. Enter a response to copy a portion of data from the worksheet or to copy any graph other than the current one.

Specify the rectangular group of cells you want to copy to Chart. If you previously named the cell group with Lotus, type the name; otherwise, type the absolute reference to the cell group. To copy a graph other than the current one, type the name of the graph.

You can identify several nonadjoining groups of cells. When you do so, separate each name or reference with a comma. The number of cell groups you can specify is limited only by the 255-character maximum length of your response.

orient series by: Row Column

Choose either *Row* or *Column*. You need to choose an option in this field only if you've chosen *Worksheet* in the "type" field.

Your choice affects the number of data series Chart creates from the worksheet cells you want to copy, and therefore the structure of the chart you make of the cells.

If you've chosen *Graph* in the "type" field, then the number of data series is already defined in your Lotus graph. Chart will therefore ignore the current response in this field.

series name(s) from:

Enter a response only if you've chosen *Worksheet* in the "type" field.

Your response in this field depends on your response in the previous field. If you've oriented series by row, type the number of the column on the Lotus worksheet containing the data (usually text) you want to use as series labels on a chart. If you've oriented series by column, type the number of the row containing the data you want to use as series labels.

categories from:

Enter a response only if:

- You've chosen *Worksheet* in the "type" field.
- You want to use text or values from the worksheet as category labels on a chart.

If you've oriented series by row, type the number of the row on the Lotus worksheet containing the data you want to use as category labels on a chart. If you've oriented series by column, type the number of the column containing the data you want to use as category labels.

category type: Sequence Number Text

If you left the "categories from" field blank, accept the proposed response of *Sequence*. Chart will consider the data it copies as sequence series and use sequential numbers as category labels on the chart you make.

If you specified a row or column of values in the "categories from" field, choose *Number* in this field. Chart will consider the data it copies as number series and use the values in the row or column you specified in the "categories from" field as category labels on the chart you make. (If, within the specified row or column, a cell contains text instead of a value, Chart will label the data point's category as zero.)

Note

Typically, you'll choose *Number* if you want to plot a scatter chart of scientific data.

If you specified a row or column of text in the "categories from" field, choose *Text*. Chart will consider the data it copies as text series and use the text in the row or column you specified in the "categories from" field as category labels on the chart you make.

Xternal dBASE

List menu

```
EXTERNAL DBASE filename:                linked: Yes No
         selected rows:          selected columns:
         orient series by: Row Column
         series name(s) from:    categories from:
         category type: Sequence Number Text
```

Purpose

To copy delimited text files created by dBASE II and dBASE III.

Remarks

This command creates a new Chart file containing the data specified by your combined responses in the "selected rows" and "selected columns" fields. For example, if you specify rows 1-10 and columns 3-7, Chart will copy the data in columns 3-7 of rows 1-10.

The structure of the resulting chart depends on your response in the "orient series by" field. For more information on orienting data by row or column, see the preceding discussion of the Xternal command. See also "Copying Data from Other Application Programs" in Chapter 5, "Preparing Data for a Chart."

This command assumes that the file you copy data from uses the single close quote character (') as a text quote character and the comma (,) as a field delimiter.

Command Fields

filename:

Type the name of the dBASE file you want to copy data from, or press any direction key to display a list of filenames to select from.

linked: Yes No

Choose *Yes* to link the Chart file to its dBASE source file. Choose *No* to make a one-time copy of data in the dBASE source file.

selected rows:

Leave this field blank to copy all rows in the file to Chart. To copy a single row of data, type the row number. To copy two or more adjoining rows, separate row numbers with a colon (:).

You can copy several nonadjoining rows. When you do so, separate each set of row numbers with a comma. For example, type *2:4,6:8,10:12* to copy rows 2-4, 6-8, and 10-12 to Chart. The number of rows you can identify is limited only by the 255-character maximum length of your response.

selected columns:

Leave this field blank to copy all columns in the file to Chart. To copy a single column of data, type the column number. To copy two or more adjoining columns, separate column numbers with a colon (:).

You can specify several nonadjoining columns. When you do so, separate each set of column numbers with a comma. For example, type *2:4,6:8,10:12* to copy columns 2-4, 6-8, and 10-12 to Chart. The number of columns you can specify is limited only by the 255-character maximum length of your response.

Your response in this field, combined with your response in the previous field, defines the number of data points copied to Chart. For example, if you specify rows 2 and 4 and columns 1, 3, and 5 on the portion of the dBASE file shown below, Chart will copy those fields (data points) represented by the shaded areas:

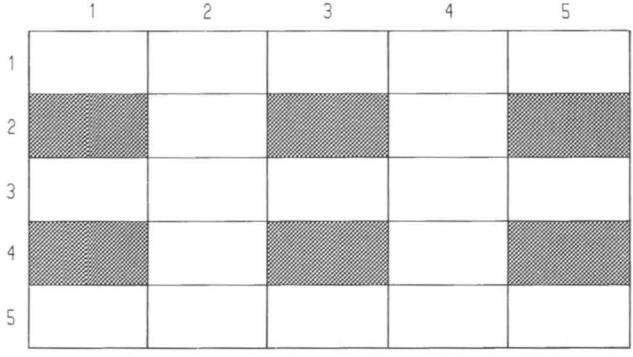


Chart treats the fields you identify as a single rectangular block of data. Areas between the fields are not reflected in any chart you make.

Note

You can copy the entire file to Chart by leaving both the "selected rows" and "selected columns" fields blank.

---

orient series by: Row Column

Choose either *Row* or *Column*.

Your choice affects the number of data series Chart creates from the fields you want to copy, and therefore the structure of the chart you make of the fields. For example, if you orient the fields shown in the above diagram by rows, Chart will treat them as two series (one for each row of fields) containing three data points each. If you orient the same fields by column, Chart will treat them as three data series containing two data points each.

series name(s) from:

Your response in this field depends on your response in the previous field. If you've oriented series by row, type the number of the column in the dBASE file containing the data (usually text) you want to use as series labels on a chart. If you've oriented series by column, type the number of the row containing the data you want to use as series labels.

categories from:

Enter a response only if you want to use text or values from the dBASE file as category labels on a chart.

If you've oriented series by row, type the number of the row in the dBASE file containing the data you want to use as category labels on a chart. If you've oriented series by column, type the number of the column containing the data you want to use as category labels.

category type: Sequence Number Text

If you left the "categories from" field blank, accept the proposed response of *Sequence*. Chart will consider the data it copies as sequence series and use sequential numbers as category labels on the chart you make.

If you specified a row or column of values in the "categories from" field, choose *Number* in this field. Chart will consider the data it copies as number series and use the values in the row or column you specified in the "categories from" field as category labels on the chart you make. (If, within the specified row or column, a field contains text instead of a value, Chart will label the data point's category as zero.)

Note

Typically, you'll choose *Number* if you want to plot a scatter chart of scientific data.

If you specified a row or column of text in the "categories from" field, choose *Text*. Chart will consider the data it copies as text series and use the text in the row or column you specified in the "categories from" field as category labels on the chart you make.

Xternal SYLK/DIF

List menu

```
EXTERNAL SYLK/DIF filename:              linked:  Yes  No
         named area or reference:
         orient series by: Row Column
         series name(s) from:        categories from:
         category type: Sequence Number Text
```

Purpose

To copy files stored in Microsoft Multiplan SYLK (Symbolic Link) format or in DIF (Data Interchange Format).

Remarks

You carry out this subcommand in the same way that you carry out the Xternal Multiplan subcommand, with the exception that how you enter references in the "named area or reference" field will depend on the application program you copy data from. For instructions on how to fill in all the other command fields, see the preceding discussion of the Xternal Multiplan subcommand.

Xternal Text

List menu

```
EXTERNAL TEXT: Columnar Delimited
```

Purpose

To copy text files stored in columnar or delimited format.

Remarks

A typical use of External Text is to copy data to Chart from a text file that you've downloaded from a mainframe computer, or to copy data from a spreadsheet that you've printed to a file. See the following pages for details on the *Columnar* and *Delimited* options.

Xternal Text Columnar

List menu

```
EXTERNAL TEXT COLUMNAR filename:          linked: Yes No
        selected rows:              selected columns:
        column width:      orient series by: Row Column
        series name(s) from:         categories from:
        category type: Sequence Number Text
```

Purpose

To copy text files stored in columnar format.

Remarks

Columnar text files are not associated with a particular application program. A columnar file is any text file that uses one or more blank spaces to delimit (separate) items of data. Numeric data in a columnar file might be stored as shown below:

```
 23     435     671      89
123      65      45     152
```

Command Fields

Command fields for this subcommand are identical to those for External dBASE, with the exception that External Text Columnar has an additional command field, "column width." For instructions on how to fill in command fields common to both External dBASE and External Text Columnar, see the preceding discussion of the External dBASE subcommand.

column width:

Type the number of characters that define the width of each column in the file you want to copy data from. If columns have different widths, separate each number you type with a comma. For example, if the first column is 20 characters wide, and each successive column is 10 characters wide, type *20,10.*

Xternal Text Delimited

List menu

```
EXTERNAL TEXT DELIMITED filename:          linked: Yes No
         text quote character:  delimited character:
         selected rows:         selected columns:
         orient series by: Row Column
         series name(s) from:    categories from:
         category type: Sequence Number Text
```

Purpose

To copy text files stored in delimited format.

Remarks

Like columnar text files, delimited text files are not associated with a particular application program. Unlike columnar files, delimited files use a specific character (such as a tab character or a comma) rather than blank spaces to delimit (separate) items of data. Delimited files also use a specific character, such as single or double quote characters, to distinguish text (usually labels) from numbers. Data in a delimited file might be stored as shown below:

'Jan','Feb','Mar','Apr'
23,435,671,89
123,65,45,152

Data in delimited files is still arranged by row and column, though the columns aren't necessarily parallel to one another. Instead, columns are defined by the positions of the delimiter character in each row of data. For example, all data positioned between the first and second delimiter character of any row are in the second "column" of that row. Therefore, when copying data from delimited files to Chart, just as when copying data from other types of files, you specify the row and column location of the data you want to copy and tell Chart whether to orient the copied series by row or by column.

Command Fields

Command fields for this subcommand are identical to those for External dBASE, with the exception that External Text Delimited has two additional command fields, "text quote character" and "delimiter character." For instructions on how to fill in command fields common to both External dBASE and External Text Delimited, see the preceding discussion of the External dBASE subcommand.

text quote character:

Type the character used to enclose text in the delimited file you want to copy data from.

delimiter character:

Type the character used to separate items of data in the delimited file you want to copy data from.

If the delimiter character is a non-printable character, such as a tab, type the decimal representation of the character. You do so by holding down the Alt key and typing the character's decimal representation on the numeric keypad. For example, to specify a tab:

1. Press the Alt key.
2. On the numeric keypad, type *0*
3. On the numeric keypad, type *8*
4. Release the Alt key.

Chapter 10
Message Directory

This directory lists in alphabetical order all the messages that may appear on the message line while you are working with Chart. The probable causes of the messages are given, followed by a description of appropriate responses.

Cannot analyze series

The Analyze command you chose does not apply to the selected series. For example, the Analyze Percent command does not apply to a data series whose values add up to zero.

No action is required. You may edit the data series so that the chosen Analyze command applies.

Cannot append series

You attempted to append a data series to another data series of a different type with the Modify Append command.

No action is required. If you want to append a data series to another data series of a different type, copy one of the series and change its type to match the other series with the Name command before using the Modify Append command.

Cannot apply command to selected object

The command you chose does not apply to the selected object. For example, the Format Arrow command does not apply to an object other than a label.

Choose a command that applies to the selected object or select a new object.

Cannot delete file

Chart cannot delete the file from the disk. Either the file does not exist, the file is not in the proper drive or directory, you typed something other than *Y* in response to the message "Enter Y to retry access to filename", or the disk is write-protected.

Make sure that the filename is correct, that the file is in the proper drive or directory, and that you've removed the write-protect tab from the disk. Then retry the command that led to the error message.

Cannot edit linked series

The selected series was created by the Analyze command and is linked to another series in the List, or the data was copied from and linked to another file with the Xternal command.

Copy the series with the Modify Copy command. The copy will not be linked and can be edited.

Cannot read file

Chart cannot read the file from disk. Either the file does not exist; the file is not in the proper drive or directory; you typed something other than *Y* in response to the message "Enter Y to retry access to filename"; the file is not in a format Chart can read; or the disk containing the file is defective.

Make sure that the filename is correct; that the file is in the proper drive or directory; and that the format of the file is either SYLK format or that of a previously saved Chart file. If the error message recurs, use the disk operating system COPY command to copy the file to a different disk. Then retry the command that led to the error message.

Cannot write file

Chart cannot write the file to the disk. Either the disk is write-protected or defective.

Make sure that you've removed the write-protect tab from the disk, then retry the command that led to the error message. If the error message recurs, write the file to a different disk.

Disk error

The system is unable to access a file on the disk.

If the error occurred while Chart was writing a file to the disk, make sure that you've removed the write-protect tab from the disk, and then retry the command that led to the error message. If the error message recurs, write the file to a different disk. If the error occurred while Chart was reading a file from the disk, retry the command that led to the error message. If the error message recurs, use the disk operating system COPY command to copy the file to a different disk. If none of these procedures is successful, there may be a problem with your hardware.

Disk full

Chart cannot write the file because there is no more room on the disk.

Use the Transfer Delete command to look at the files on the disk and delete unneeded files, or write the file to a different disk.

Enter adapter name

The "adapter" field of the Print Setup command requires the name of a parallel or serial adapter.

Type the name of the parallel adapter (LPT1:, LPT2:, or LPT3:) or serial adapter (COM1: or COM2:) to which your printing device is connected. See the Print Setup command in Chapter 9, "Command Directory," for details.

Enter arrowhead position or use direction keys to point

The "position" field of the Format Arrow command requires a position in screen coordinates.

Use the direction keys to move the selection arrow to where you want the selected arrow's label to point. You can also specify the arrow's position by typing in the screen coordinates. Screen coordinates will be in inches or centimeters depending upon your response in the "unit" field of the Options command. See the Format Arrow command in Chapter 9, "Command Directory," for details.

Enter color name or use direction keys to select from list

The active command field of the Format Color command requires the name of a color.

Type a color name, or use the direction keys to select from a list of the colors available for the device specified in the "device" field of the Print Setup command.

Enter data reference or use direction keys to select from list

The "categories name" or "values name" field of the Xternal command requires the name of or absolute reference to the data in the file you are copying from.

Type an absolute reference to the data, or use the direction keys to select from a list of the names defined in the file. See "Copying Data from Multiplan Worksheets" in Chapter 5 and the Xternal command in Chapter 9, "Command Directory," for details.

Enter date

The "category start" field of the Name command requires a date.

Type the starting date for the categories of a Date series in any standard date format. See the Name command in Chapter 9, "Command Directory," for details.

Enter device name or use direction keys to select from list

The "device" field of the Print Setup command requires the name of a device.

Type the name of the device, or use the direction keys to select from a list of the devices supported by Chart.

Enter drive or directory

The "setup" field of the Transfer Options command requires the name of a drive or directory.

Type the name of a drive or directory to be the default data drive or directory. See the Transfer Options command in Chapter 9, "Command Directory," for details.

Enter filename

The active command field requires the name of a file to be written.

Type the name of the file you want to write.

Enter filename or use direction keys to select from list

The active command field requires the name of a file to be read or deleted.

Type the name of the file you want to read or delete, or use the direction keys to select from a list of files.

Enter font name or use direction keys to select from list

The active command field requires the name of a font.

Type the name of a font, or use the direction keys to select from a list of the fonts available for the device specified in the "device" field of the Print Setup command.

Enter font size in points or use direction keys to select from list

The active command field requires the size of a font in points.

Type a font size in points, or use the direction keys to select from a list of sizes available for the specified font.

Enter line number or use direction keys to select one

The active command field requires the line number of a data series or data point.

Type the line number of the data series or data point, or use the direction keys to select one.

Enter list of series numbers

The "series" field of the Format Type command (chart selected) requires a list of the numbers of the data series to be included in the selected chart.

Type the line numbers of the data series you want to include in the selected chart. The numbers should be separated by commas and listed in the order in which you want the series included. See the Format Type command (chart selected) in Chapter 9, "Command Directory," for details.

Enter marker type or use direction keys to select from list

The "type of marker" field of the Format Type command (series/point selected) requires the name of a marker type.

Type the name of a marker type, or use the direction keys to select from a list of marker types available for the device specified in the "device" field of the Print Setup command.

Enter measurement in (units)

The active command field requires a number which represents a measurement.

Type the number of units in either inches or centimeters depending upon your response in the "unit" field of the Options command. See the Options command in Chapter 9, "Command Directory," for details.

Enter number

The active command field requires a single integer.

Type an integer.

Enter pattern name or use direction keys to select from list

The active command field of the Format Pattern command requires the name of a pattern.

Type a pattern name, or use the direction keys to select from a list of the patterns available for the device specified in the "device" field of the Print Setup command.

Enter pen size in millimeters

The "pen size" field of the Print Options command on the Chart menu requires the pen size of the plotter in millimeters.

Type the pen size of the plotter in millimeters.

Enter position or use direction keys to point

The "to position" field of the Move command requires a position in screen coordinates.

Type the desired position of the frame of the selected object in screen coordinates, or use the direction keys to move the frame to the desired position on the screen. Screen coordinates will be in inches or centimeters depending upon your response in the "unit" field of the Options command. See the Move command in Chapter 9, "Command Directory," for details.

Enter series,point or use direction keys to select from list

The "series,point number" field of the Format Type command (label selected) or Format Arrow command requires the number of a data series or data point.

Type the number of a data series, or of a data series followed by a comma and the number of a data point within that series; or use the direction keys to enter the number of the data point that you want the selected label to indicate or its arrow to point to. See the Format Type (label selected) and Format Arrow commands in Chapter 9, "Command Directory," for details.

Enter size or use direction keys to point

The "width" or "height" field of the Format Size command requires a number which represents a measurement.

Type the desired number of units of the measurement, or use the direction keys to change the frame size of the selected object to the desired size on the screen. Units of measurement will be in inches or centimeters depending upon your response in the "unit" field of the Options command. See the Format Size command in Chapter 9, "Command Directory," for details.

Enter text

The active command field requires text.

Type any desired text.

Enter value

The active command field requires a single value.

Type a value in any standard numeric format.

Enter Y after mounting (color names)

The plotter requires a manual pen change either before or during printing.

Mount the specified pen colors and type *Y*. Pressing the CANCEL key causes Chart to pause and display the message "Enter Y to continue." Pressing the CANCEL key again cancels printing and returns you to the main command menu.

Enter Y to confirm

You have chosen a command, such as Transfer Clear, that could result in the loss of data.

If it is safe for the command to proceed, type *Y*. Otherwise, press the CANCEL key to cancel the command and return to the main command menu.

Enter Y to confirm change of categories

You have changed the response in the "category type" field of the Name command. This could result in the loss of category data for the selected data series.

If you want to change the category type, type *Y*. Otherwise, press the CANCEL key to cancel the command and return to the main command menu.

Enter Y to continue

Chart has paused during printing because you have pressed the CANCEL key.

If you want to continue printing, type *Y*. Otherwise, press the CANCEL key to cancel printing and return to the main command menu.

Enter Y to overwrite file

You have asked Chart to write a file to disk with the same filename as that of an existing file on the disk. If Chart continues, it will replace the existing file with the new one.

If you want to replace the existing file, type *Y*. To preserve the existing file, press the CANCEL key and retry the command, giving the file a different name.

Enter Y to retry access to (filename)

Chart cannot access the named file.

If you have misspelled a filename, press the CANCEL key and retry the command that led to the error message. If the file is not in the drive on which Chart is looking, insert a disk containing the file and type *Y*. If the file is not the one you want, if you cannot change disks, or if the message recurs, press the CANCEL key to cancel the command and return to the main command menu. If you see either of the messages "Enter Y to retry access to MC.PGM" or "Enter Y to retry access to MC.HLP", Chart requires access to the named files on the Chart Program disk.

Insufficient memory

Chart has run out of storage space; no more work is possible.

Save your charts and data; then delete some data with the Modify Delete command to free some storage space.

List is empty

You have asked Chart to display a list of choices in a menu command field, but there are no choices in the list.

No action is required. The message confirms that the list is empty.

Not a valid adapter name

The serial or parallel adapter name you entered in the "adapter" field of the Print Setup command is either incorrect or does not exist.

Reenter the name of the parallel adapter (LPT1:, LPT2:, or LPT3:) or serial adapter (COM1: or COM2:). See the Print Setup command in Chapter 9, "Command Directory," for details.

Not a valid color name

The color name you entered in a field of the Format Color command is either incorrect or does not exist.

Type a valid color name, or use the direction keys to select from a list of valid color names.

Not a valid data reference

The data reference in the "categories name" or "values name" field of the Xternal command is more than one column wide or one row high.

Change the response to refer to an area one column wide or one row high. See "Copying Data from Multiplan Worksheets" in Chapter 5 and the Xternal command in Chapter 9, "Command Directory," for details.

Not a valid date

The date you entered in the "category start" field of the Name command is either incorrect or outside the acceptable range.

Type a valid starting date for the categories of a Date series in any standard date format. See the Name command in Chapter 9, "Command Directory," for details.

Not a valid device name

The device name you entered in the "device" field of the Print Setup command is either incorrect or does not exist.

Type a valid device name, or use the direction keys to select from a list of devices supported by Chart.

Not a valid drive or directory

The drive or directory you entered in the "setup" field of the Transfer Options command is either incorrect or does not exist.

Type the correct name of a drive or directory. See the Transfer Option command in Chapter 9, "Command Directory," for details.

Not a valid filename

The filename you entered contains illegal characters.

Type the correct filename. See "Files and Filenames" in "Operating Information" for details.

Not a valid font name

The font name you entered is incorrect or does not exist.

Type a valid font name, or use the direction keys to select from a list of valid font names.

Not a valid font size

The font size you entered is either incorrect or outside the acceptable range.

Type a valid font size, or use the direction keys to select from a list of valid font sizes.

Not a valid line number

The line number you entered is either incorrect or outside the acceptable range.

Type a valid line number, or use the direction keys to select a valid line number.

Not a valid marker type

The name of the marker type you entered in the "type of marker" field of the Format Type command (series/point selected) is either incorrect or does not exist.

Type a valid marker type, or use the direction keys to select from a list of valid marker types.

Not a valid number

The integer you entered is either incorrect or outside the acceptable range.

Type a valid integer.

Not a valid option

The key you pressed does not correspond to any of the current menu options.

Check the menu for the option you want and press the key of its initial letter.

Not a valid pattern name

The pattern name you entered in a field of the Format Pattern command is either incorrect or does not exist.

Type a valid pattern name, or use the direction keys to select from a list of valid pattern names.

Not a valid pen size

The "pen size" field of the Print Options command on the Chart menu is either incorrect or outside the acceptable range.

Type the pen size in millimeters.

Not a valid position

The arrowhead or frame position you entered in the Format Arrow or Move command is either incorrect or outside the acceptable range.

Type a valid position in screen coordinates for the arrowhead or the frame of the selected object, or use the direction keys to move the arrowhead or frame to a valid position on the screen. Screen coordinates will be in inches or centimeters depending upon your response in the "unit" field of the Options command. See the Format Arrow and Move commands in Chapter 9, "Command Directory," for details.

Not a valid print device

You tried to print a chart with the Print Printer command on the Chart menu when the response in the "device" field of the Print Setup command is *Screen* rather than the name of a valid printer or plotter.

Type the name of a valid printer or plotter in the "device" field of the Print Setup command, or use the direction keys to select from a list of valid printers or plotters. Then retry the Print Printer command. See Chapter 8, "Saving and Printing Charts," and the Print commands in Chapter 9, "Command Directory," for details.

Not a valid size

The frame size you entered in the "width" or "height" field of the Format Size command is either incorrect or outside the acceptable range.

Type a valid number of units of measurement for the frame of the selected object, or use the direction keys to correctly size the frame on the screen. Units of measurement will be in inches or centimeters depending upon your response in the "unit" field of the Options command. See the Format Size command in Chapter 9, "Command Directory," for details.

Not a valid value

The value you entered is either incorrect or outside the acceptable range.

Type a valid value in any standard numeric format.

Printer error

The printer or plotter is not responding to a request from Chart.

Check to see that the device is connected properly and is ready to print, then retry the Print Printer command.

Printing...

Printing is in progress.

No action is required. The main command menu will return when printing is complete. Pressing the CANCEL key causes Chart to pause and display the message "Enter Y to continue". Pressing the CANCEL key again cancels printing and returns you to the main command menu.

Range responses conflict

The responses you gave in the Range command (value axis selected) conflict. For example, your response in the "maximum value" field is less than your response in the "minimum value" field.

Retry the command, giving valid responses. See the Range command (value axis selected) in Chapter 9, "Command Directory," for details.

Reading line (number)

Chart is reading a Symbolic (SYLK) file.

No action is required. The main command menu will return when the last line of the file has been read.

Response too long

A response in a fill-in command field exceeds the length limit.

Rephrase your response so that it is shorter.

Select option

Chart is waiting for you to choose from a list of options in a menu command field.

Choose an option by pressing the key of its initial letter.

Select option or type command letter

Chart is waiting for you to choose from a list of commands in a command menu.

Choose a command by pressing the key of its initial letter.

Too many charts

You attempted to include more than the allowable number of charts.

No action is required. Sixteen is the maximum number of charts, whether separate or overlaid.

Too many data points

You attempted to insert too many data points in a data series or a chart.

No action is required. A data series can have a maximum of 64 data points. A chart can have a maximum of 512 data points.

Writing line (number)

Chart is writing a Symbolic (SYLK) file.

No action is required. The line number increases as the file is written. The main command menu will return when the last line of the file has been written.

Appendix A
Fonts

This appendix provides the following information:

- How fonts are named
- What fonts are available with Chart
- How to use the font files that are supplied with Chart
- How to create additional font files that can be used with Chart
- Examples of fonts that are provided with Chart

Chart supports built-in fonts for your screen or plotter, plus a number of fonts included in font files on the Chart Font disk. When you select a label, a legend, or an axis, the Format Type command allows you to specify the font name and size for the text.

Font Names

The attributes that control the appearance of characters are the font, the font size, and whether the characters are bold or italic face. There are 64 basic fonts divided into several classes, with names reflecting the way they are intended to be used. Each of these classes contains a number of variants, designated by a single letter (for example, Roman A).

Font classes and descriptions are given below:

Font	Description
Modern A - Modern P	Modern fonts. Composed of lines of uniform width, either without serifs ("sans-serif") or with serifs of the same line quality. Most typewriter fonts are in this class.
Roman A - Roman P	Roman fonts. Classic design with serifs and strokes of varying width.
Script A - Script H	Script fonts. Slanted characters formed from nearly continuous curved lines.
Decor A - Decor H	Decorative fonts. Used for titles.
Foreign A - Foreign H	Foreign fonts. Greek, Kana, and other foreign character sets. Fonts that expand the English alphabet by only a few characters or diacritical marks are not included in this class.
Symbol A - Symbol H	Symbol fonts. The character sets in these fonts do not correspond to any alphabet, but are composed entirely of special symbols.

The font name may be preceded by the words "Bold," "Italic," or "Bold Italic" to indicate the face of the font.

Fonts Available with Chart

The standard font used by Chart for text is called "Modern A." For dot-matrix printers, Chart uses the same font that you see on the screen. For plotters and other devices, Chart uses the built-in font most similar to Modern A. In this case, Chart displays the name of the font it substitutes in the "font" field of the Format Type command.

All the fonts and font files provided with Chart are listed below. Examples of each are given at the end of this appendix. You can enter any of these fonts in the Format Type command by typing its name, or you can use the direction keys to select from a list of the fonts available for the device specified in the "device" field of the Print Setup command.

If a requested font file is not available for the device on which the chart is being displayed or printed, Chart will substitute the nearest equivalent. If a requested font size is not available, Chart will substitute the closest size available.

Two types of fonts are provided on the Chart Utilities disk: raster fonts and stroke fonts.

Raster fonts can be used only with raster devices such as the screen and dot-matrix printers. They are available only in fixed sizes, with a separate font file required for each point size that is available. The advantages of raster fonts are that they look better than stroke fonts when drawn on raster devices, and they can be drawn much more quickly than stroke fonts.

If you use the direction keys to select from a list of the available fonts, the raster fonts will be listed only if the device specified in the "device" field of the Print Setup command is *Screen* or a dot-matrix type printer.

The following raster fonts are provided with Chart:

Font	Filename
Modern A (screen)	(built-in)
Modern C	F00225.RFT F00230.RFT F00235.RFT
Decor E	F05230.RFT F05237.RFT F05243.RFT
Italic Modern C	F06625.RFT F06630.RFT F06635.RFT
Bold Modern C	F13025.RFT F13030.RFT F13035.RFT

Stroke fonts can be used on the screen and on printers and plotters, though they look best on stroke devices such as plotters. They can be drawn in any size up to 127 points. The following stroke fonts are provided with Chart:

Font	Filename
Modern A (screen)	(built-in)
Modern B	F001.SFT
Roman B	F017.SFT
Script B	F033.SFT

Font	Filename
Italic Roman B	F081.SFT
Bold Modern B	F129.SFT
Bold Roman B	F145.SFT
Bold Italic Roman B	F209.SFT

Using Font Files Supplied with Chart

If your computer has at least 256K of memory, you will be able to use the fonts provided on the font disk. Otherwise, Chart will always use the built-in screen font for displaying charts on the screen and on dot-matrix type printers, and the built-in plotter font for displaying charts on plotters.

For a font file to be available to Chart, it must be listed in the file FONTLIST. All of the font files provided with Chart are included in the file FONTLIST on the Chart Program disk.

If you start Chart from a floppy disk drive, it will look for FONTLIST on the Chart Program disk. If you start Chart from a hard disk drive, it will look for FONTLIST in the MSTOOLS directory. As font files are needed, Chart will look for them on the same drive or directory on which FONTLIST was found. If Chart cannot find a requested font file, it will display the message:

```
Enter Y to retry access to (filename)
```

"Filename" is the name of the font file. At this point, if you are using floppy disk drives, you should replace the Chart Program disk with the Chart Font disk and press *Y*. After Chart has loaded the font file, it will display the message

```
Enter Y to retry access to MC.PGM
```

at which point you should reinsert the Chart Program disk and press *Y*.

If you are using a hard disk, you cannot switch disks. Instead you must press the CANCEL key in response to the first message. Chart will then substitute the nearest equivalent font file.

If you are using floppy disks, you may want to copy a few of the fonts that you use most to the Chart Program disk so that you will not have to switch disks. If you are running Chart from a hard disk, all of the font files listed in FONTLIST should be in the MSTOOLS directory.

Additional Fonts

You can add either raster fonts or stroke fonts that can be used by Chart by following these steps:

1. Create a file in the format described below under "Specification for a Raster Font (RFT) File" or "Specification for a Stroke Font (SFT) File."

2. Name the file according to the font file naming rules described below.

3. Add the name of the new file to the FONTLIST file.

Font Filenames

Raster font filenames consist of the letter F, followed by the three-digit decimal integer between 0 and 255 describing the font, a two-digit decimal integer repesenting the height of the font in pixels, and the extension .RFT.

Stroke font filenames consist of the letter F, followed by the three-digit decimal integer between 0 and 255 describing the font, and the extension .SFT.

To determine the decimal integer that describes a font, determine the class that most closely describes the font's characteristics as given under "Font Names" above. Choose a variant letter that does not conflict with existing font filenames.

The possible numbers for each class of font are as follows:

Font	Class	
Modern A - Modern P	Normal	0-15
	Italic	64-79
	Bold	128-143
	Bold Italic	192-207
Roman A - Roman P	Normal	16-31
	Italic	80-95
	Bold	144-159
	Bold Italic	208-223
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	Italic	120-127
	Bold	184-191
	Bold Italic	248-255

Specification for a Raster Font (RFT) File

A raster font file is in binary format. Its contents are as follows:

Byte	Information
0-1	Identification number - 0X011E.
2-3	Total size of all bit patterns, given in bytes.
4-5	Maximum character width, in pixels.
6-7	Maximum character height, in pixels.
8-9	The number zero.

10-2569 256-bit pattern descriptors (one for each character). Descriptors have the following format:

Byte	Information
0-1	Offset from beginning of bit pattern data at which pattern for this character begins.
2-3	Number of bytes in the bit pattern for this character.
4-7	Four signed bytes that define the character box and the origin of the character within the box. The four bytes are, in order, the top, bottom, left, and right extents of the character box, in pixels.
8-9	Width of this character, in pixels.

2570-?? Start of bit patterns. Each bit pattern defines one character as a series of raster lines from top to bottom. Each raster line begins and ends on a byte boundary.

Specification for a Stroke Font (SFT) File

A stroke font file is in binary format. Its format is based on a character box which has an arbitrary dimension of 128 by 128 "stroke" units. The origin of the character box is the upper left-hand corner. The file contents are as follows:

Byte	Information
0-1	Identification number - can be any value.
2-3	Total size of all stroke patterns, given in bytes.
4-5	Maximum character width, in stroke units.

6-7 Maximum character height, in stroke units.

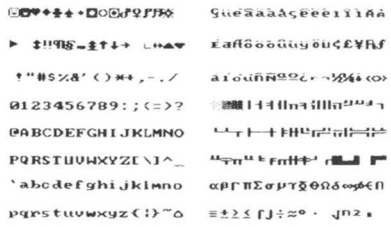
8-9 The number zero.

10-2569 256-bit pattern descriptors (one for each character). Descriptors have the following format:

Byte	Information
0-1	Offset from beginning of stroke pattern data at which pattern for this character begins. Contains 0XFFFF if no pattern exists for this character.
2-3	Number of bytes in the stroke pattern for this character.
4-7	Four signed bytes that define the origin of the character within the box. The four bytes are, in order, the top, bottom, left, and right distances of the character's origin measured from the origin of the character box, in stroke units.
8-9	Width of this character, in stroke units.

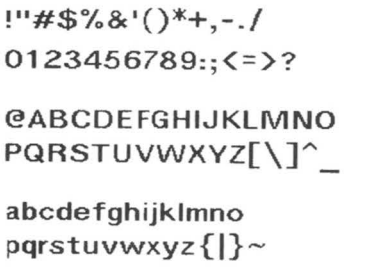
2570-?? Start of stroke patterns. Each pattern consists of a list of pairs of bytes. Each pair describes a point within the 128 by 128 character box that is moved to or drawn to. The starting position of the pen is the origin of the box, with the pen in the up position. The pair of bytes has the following format:

Byte	Information
0	High-order bit: 1 means the pen should be raised to the up position after reaching this point; there will not be a line drawn to the following point. 0 means the pen should be lowered to the down position after reaching this point; there will be a line drawn to the following point. Low-order 7 bits: the horizontal position of the point
1	High-order bit: 1 indicates the last point of a pattern. 0 indicates an intermediate point. Low-order 7 bits: the vertical position of the point.

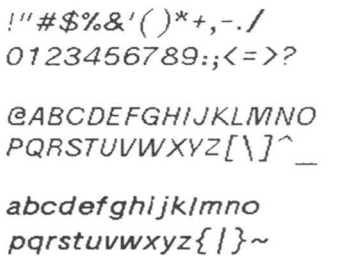


Modern A (Screen)

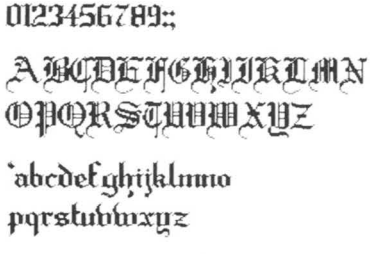
Modern C



Bold Modern C



Italic Modern C



Decor E

Modern B

Figure A.1. Font Samples

Figure A.1 (Continued). Font Samples

Glossary

Alignment

The horizontal position of text or numbers within the category column or a label.

Arrow

A line, usually with an arrowhead, that points from a label to the object it identifies.

Auto

As a response in a command field, *Auto* (automatic) means that Chart will determine a reasonable response for the accompanying command field, based on built-in design principles. See "Auto-Set Fields" in Chapter 6, for more information.

Axis

One of the lines of a chart along which values are plotted. The lines may show a measure of time or amount, or may serve as the base for text categories.

Border

The line around a bar, column, area, or wedge. If the pattern of the border is Clear, the line will be invisible.

Box

An area of the display that may contain one, several, or no charts. You create boxes with the Split command; you insert charts into specific boxes with the Insert Chart New command.

Category

The items or subjects of a chart for which you will chart values. Categories may be names of people, places, or things; or times, such as days, months, or years. In mathematics, the category is the independent variable. See "Value."

Category axis

The line that shows the categories of a chart. In mathematics, this line is the independent axis. The category axis is horizontal except in bar charts.

Character

Any digit, letter, punctuation mark, or special mark (such as @, |, *, %, $) that you can type.

Chart

In Microsoft Chart, "chart" refers to the display on the Chart screen as a whole (or a printed copy of it). It is also the command to draw a chart (the Chart command) and the designation for the screen displaying a chart (Chart screen) and its associated menu (Chart menu). More precisely, a chart is an object consisting of other objects that represent numeric data in graphic form. The objects within a chart can be selected individually, and the chart itself can be selected as a whole. There may be more than one chart on the screen at a time, freely positioned or overlaid (directly on top of one another). One of the charts is the current, or selected, chart.

Chart type

The principal characteristics of a chart: whether it shows data as areas, bars, columns, lines, wedges, or with markers (scatter chart).

Chart redesign

When you make changes to a chart, such as inserting a legend or adding or deleting a series, these changes cause Chart to redraw the chart so that all parts fit nicely in the space available. Chart redesigns charts whenever any aspect of the format changes, when the number of data series changes, when the number of charts changes, and when the device (printer, plotter, or screen) changes.

Cluster

A group of bars or columns in the same category. The bars or columns represent values from different series.

Command

An instruction to Microsoft Chart to do something. A command may have one or more command fields in which you give details about how the command should be carried out.

Command field

A command field is a space in which you enter information or make choices so that Chart can carry out the command as you want it to. Command fields appear whenever you choose a command that requires additional information. The names of the command fields appear in lowercase letters with a colon following.

Command menu

A list of commands or subcommands near the bottom of the screen.

Current chart

The chart containing the selected object. If there is only one chart, that chart is always current. When there is more than one chart on the screen, the current chart is indicated in the lower left corner ("Chart 1," "Chart 2," and so on).

Data point

A category and its associated value together are a data point.

Data series

A set of data points. Each line on the List screen represents one data series. The Entry screen shows the contents of a data series.

Device

Any piece of equipment displaying or printing output from Chart; the screen or any installed printer or plotter.

Direction key

Any cursor key: RIGHT, LEFT, UP, DOWN.

Directory

The table of filenames the operating system keeps on each disk. The directory lists each file on the disk. In DOS version 2.0, each disk may be subdivided into two or more separate directories.

Drop lines

Lines extending from the highest or lowest value in each category to the category axis. To alter drop lines, the entire chart must be selected.

Entry

The Entry screen shows the data contained in one data series. The Entry menu provides commands that add, delete, or format data points in the data series.

File

A named unit of data stored on disk. In Chart, data and formats are stored together in files. You have access to these files with the Transfer command, which transfers them back and forth between disk and memory.

Filename

The name of a file.

Font

The style of characters used in labels and legends.

Format

The way a chart is displayed or printed. Format applies both to data (for example, numbers may be displayed in dollar format) and parts of a chart. You define and change format with the Format and other commands.

Frame

The rectangular border of a chart, legend, label, or the plot area (the axis frame). Frames can be moved and their size can be changed. Initially, most frames have the Clear pattern and, therefore, are invisible.

Gallery

A set of pictorial examples of chart types available by choosing the Gallery command.

Grid lines

Lines perpendicular to an axis and extending all the way through the plot area. Grid lines are extensions of tick marks.

Highlight

An area of the display that appears emphasized. Highlights indicate the active command field, the selection, and the current menu item. The most common form of highlight is reverse video.

Hi-lo lines

Lines extending from the highest to the lowest value in each category. To alter hi-lo lines, the entire chart must be selected.

Include

To mark a data series for charting. Series may be included or excluded in the List.

Key

A box, line, color, or similar small mark that is used to match a label (alone or in a legend) with a part of the chart. For example, a label "Sales" may have a thick solid line next to it to show that the thick solid chart line represents sales numbers.

Label

An object that identifies a part of a chart with text. The text may also include numbers, but these numbers are treated as letters rather than as values.

Legend

A box that holds one or more labels that identify the names of the data series or categories displayed in the chart. Each entry in the legend has a pattern key that lets you know what each label refers to.

Link

A connection between data series, charts, or a data series and a source of data such as a Multiplan worksheet. In Chart, you can use the Xternal command to link a data series to a Multiplan worksheet or to a data series in a different Chart file. The Analyze commands establish links between series in the List. The Format Link command creates and severs links between charts.

List

The List screen shows the name and other information about each data series in memory. The List menu provides commands that act on one or more data series as a whole.

Load

To transfer saved data and/or chart formats to the computer's working storage with the Transfer Load command. The file must previously have been stored with the Transfer Save command.

Main command menu

The list of command names that appear at the bottom of the screen whenever Chart is ready for you to choose one of the main commands. Chart has three main command menus: the List menu, the Entry menu, and the Chart menu.

Marker

A symbol showing the location of a data point on a line or scatter chart.

Master chart

When two charts are linked, one is the master. Linked formats on the other chart will be derived from the master chart.

Master object

When selecting objects on the chart, it is possible to select and format a master series/point, series/point label, or value label. The master object is like a template for the formats of all similar objects.

Menu

A list of alternatives, either of commands in the command menu or options in a command field, that control the operation of Chart.

Message line

The next to the last line on the screen, where messages are displayed. All Chart messages are described in Chapter 10, "Message Directory."

Name

A designation for a data series, the categories in a series, or the values in a series. You use the Name command to define names.

Object

A part of the drawing on the screen, specifically a chart, label, legend, axis, data series or data point. An object may be selected with the direction keys. Other elements of a chart are components of selectable objects. For example, tick marks are components of axes.

Pattern

Designs used to distinguish parts of the chart. You can change an object's pattern with the Format Pattern command.

Plot area

The area within which the data points are actually charted; the smallest rectangle bounded by both axes.

Point

A data point. In a "font size" field, a unit of measure for determining the size of letters and numbers (1/72 inch).

Proposed response

A response supplied by Chart in a command field. The proposed response is usually based on your most recent response or the current status of the program. See also "Response."

Response

What you type in a command field to tell Chart how to carry out a command. When Chart displays a command on the command line, it usually supplies a proposed response in every field of the command; you may replace the response, edit it, or leave it as proposed. See also "Proposed response."

Save

To make a copy on disk of the data in the List and the current chart format (using the Transfer Save command).

Scale

The range of values along a value axis, including the interval between one value on the line and the next.

Scrap

An area in memory in which the last deleted chart and all labels deleted in the current session are kept until you choose the Transfer Clear Scrap or Quit command.

Select

To designate a series on the List screen, a data point on the Entry screen, or an object on the Chart screen. The selected object will be affected by the next command you choose. To select an object (data series, value, category, or chart object), use the direction keys. The selection is indicated in two ways: by a designation in the lower left corner of the screen and by highlighting or a thick arrow on the screen.

Series

See data series.

Set

As a response in a command field, *Set* means that Chart will not determine a response for the previous field based on built-in design principles, but will always use the response you entered. See "Auto-Set Fields" in Chapter 6 for more information.

Status line

The bottom line of the screen. The status line indicates the current selection, the name of the main command menu ("List," "Entry", or "Chart"); the percent of memory still available for data and charts ("% Free"); and the name of the file most recently loaded or saved.

Text

Any group of characters that appears in a label or the category column of a Text series.

Tick marks

Short lines perpendicular to the axes that mark the scale or division between categories at regular intervals.

Type

A number of things in Chart can have different types. The chart type refers to the basic shape (such as area, bar, column) used to plot data; the type of series refers to what kind of information is in the category column (dates, words, numbers). See the Format Type command in Chapter 9, "Command Directory" for more information.

Unit

Numbers indicating measurements of size or distance may be interpreted by Chart as either inches or centimeters. The interpretation depends on the response in the "unit" field of the Options command: *Inch* for inches or *Cm* for centimeters.

Value

The number paired with a category in a data series. In mathematics, the value is the dependent variable. See "Category."

Value axis

The axis along which the values are plotted. In mathematics, this is the dependent or the y-axis.

Weight

The thickness of a line.

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